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Journal of The Southern Medical Association

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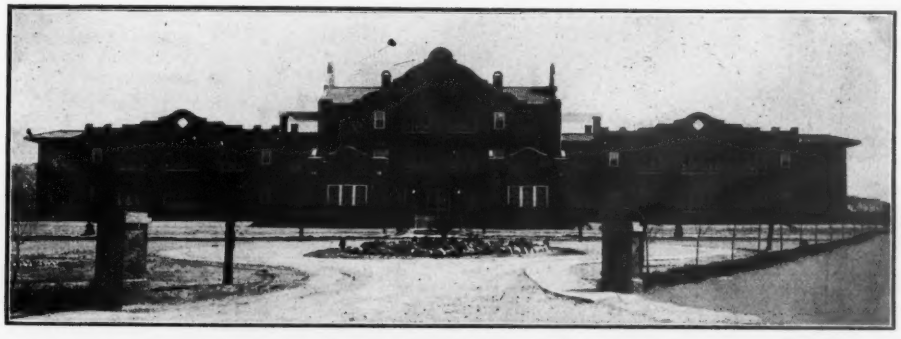

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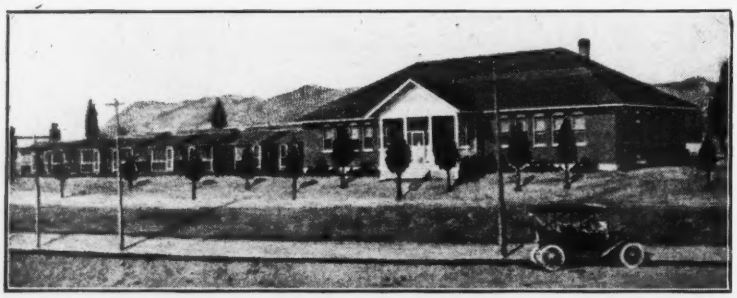

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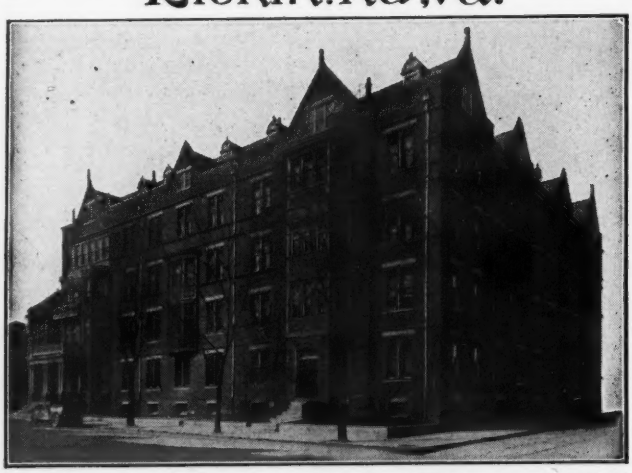

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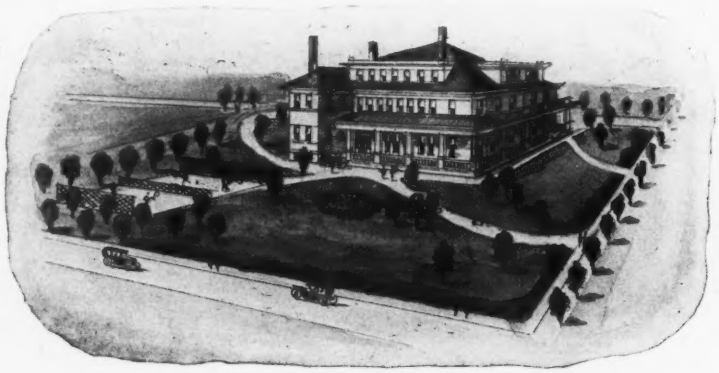

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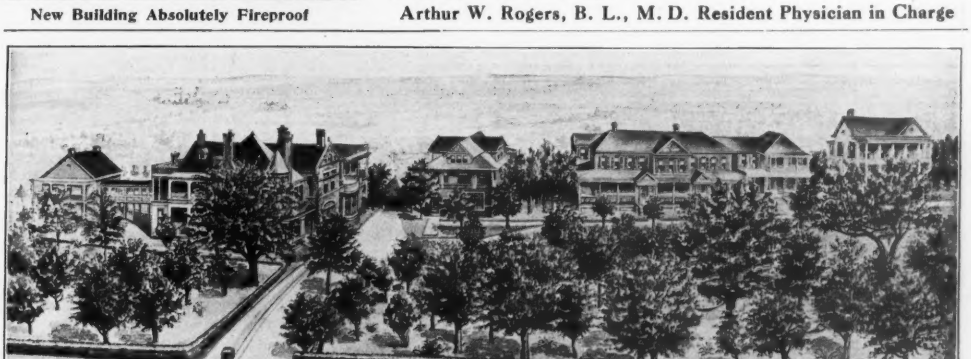

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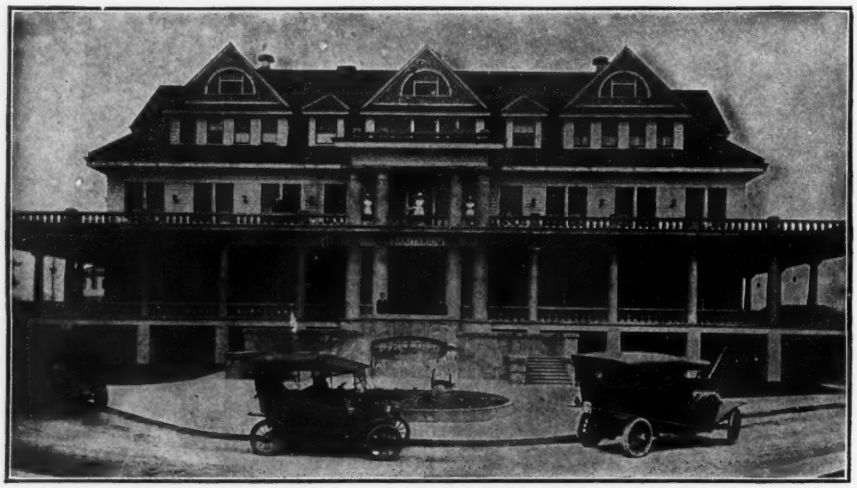

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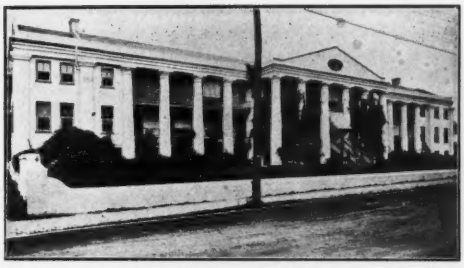

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JOURNAL OF THE SOUTHERN MEDICAL ASSOCIATION
PUBLISHED MONTHLY AT BIRMINGHAM, ALABAMA

Volume IX | MARCH 1, 1916 | Number 3

MEDICINE

(INTERNAL DISEASES, PEDIATRICS, NEUROLOGY, DIAGNOSTIC METHODS, ETC.)

BLOOD PRESSURE AND EXERCISE COMBINED AS A TEST OF HEART EFFICIENCY.*

BY J. S. LANKFORD, M.D.
San Antonio, Texas.

Jumping jugulars, cyanotic lips, embarrassed breathing and quivering clothes over a pounding heart tell a plain story, and it is easy to see the truth and predict the future. Where the condition is not so patent the stethoscope or polygraph will possibly reveal the facts. But there are many cases of heart disease that remain in doubt in spite of all of our usual tests. It has happened to some of us to embarrass a patient with a warning of danger and to see him live on in perfect health long years, and to give another every assurance of safety and then to be shocked by his sudden death. Anything, therefore, that will aid us in the correct diagnosis and prognosis of heart disease must be of great service.

In blood pressure reading before and after exercise we have a test that is simple, easy and reliable. Jackson, of Rochester, interested me in this subject and four years' experience in almost daily use of the instrument has convinced me that we have no more dependable means of determining the integrity and reserve power of the heart in health and in disease than this test. It will prove up the strong, sound heart that means so much in longevity, and will quickly show departures from the normal. And it will give us information in some cases that can not be obtained in any other way.

While the patient is seated and at rest the brachial pressure should be taken and the instrument left applied to be carried in the other hand. According to size, and strength or weakness, he is put up from one to three flights of average stairs at medium speed and the pressure noted again within thirty seconds. The systolic pressure should rise fifteen to forty millimeters. Putting on and releasing the pressure every twenty seconds, it will be found to return to its original place in from one to three minutes. If the heart is normal the diastolic pressure will remain about stationary. If the systolic rises but five to ten millimeters the heart is limited in force and power and is questionable, however sound it may appear by other tests. If the systolic fails to rise, or falls five or ten millimeters and the diastolic rises, still further diminishing the pulse pressure, the condition of the myocardium is grave. One of two conditions exists. Degenerative changes are vital and important and the prognosis is bad; or there is a poisoned heart with a serious toxic condition that may possibly be relieved by treatment. The other attending symptoms will point the way to the truth. It is essential that the second reading be made quickly and be repeated about three times a minute till the test is complete. In a safe heart the response should be prompt and the increase in pulse rate will be found to be about one beat for each millimeter of systolic pressure. If a stairway is not available the patient can exercise by standing and touching the floor twelve or fifteen times. In the obese this should

*Read in Section on Medicine, Southern Medical Association, Ninth Annual Meeting, Dallas, Texas, Nov. 8-11, 1915.

be done slowly. If the subject is strong, muscular and accustomed to exercise, it will require more effort to raise the pressure. Various forms of exercise will serve the purpose, but it is well to establish and follow a system and to regulate the amount of exertion according to the case.

In arteriosclerosis and cardio-renal disease with high blood pressure this test should be employed with caution, especially if there is a history of syphilis.

There are a number of conditions in which it can be very serviceable.

Sinus arrhythmia is common and sometimes confusing. If the pulse is not regulated by putting the mind at ease, by a little exercise or by a few moderate strokes with the closed fist over the seventh cervical vertebra, exercise and blood pressure combined will quickly and certainly reveal the simple condition.

Extra systoles are still more puzzling, for this, we know, may occur practically without disease, at any age, and may also be one of the attending symptoms in the gravest trouble. It is quite possible to differentiate by these means and possibly save a patient from a life-time of anxiety.

Murmurs without organic disease can be robbed of terror by this test.

It is not uncommon for the ravages of the streptococcus to leave its mark in a decided mitral or other rough murmur that will leave us in doubt with our ordinary methods. But if there is no hypertrophy or other unfavorable condition, and recurrence is unlikely, and the response is prompt and satisfactory, a favorable prognosis is entirely safe.

More important still is the application of this test in well marked cardiac disease in directing the life and habits of the patient. Sometimes we have a patient presenting all the classical symptoms, and we are in doubt how much freedom he may be permitted in following his occupation, in diet, place of residence, and so forth. It doesn't matter what his symptoms are if repeated tests prove the integrity of his heart muscle up to a high standard he may be allowed a wide range of liberty. On the other hand, if other indications are not grave, but he fails persistently to meet the requirements of this test, his condition is not satisfactory, can easily grow worse, and he must regulate his life so as to live within the reserve power of his heart. This test is a valuable guide in the prognosis and treatment of cardiac trouble in those cases where it is permissible, and it is interesting to watch the return to the normal with increasing compensation under the influence of digitalis.

In the treatment of tuberculosis, diabetes, nephritis and many other chronic diseases the heart is of such vital importance that if we have a means of estimating its power we are in a much better position to give a sound prognosis and to know what to do. In many of these cases where the response is not satisfactory it is astonishing how promptly the blood pressure will swing toward the normal under alkaline treatment, showing that acidosis is partly responsible. The earliest indication of tuberculosis may be unsatisfactory blood pressure and calcium deficiency.

In the treatment of poisoned heart where this vital organ has been cursed and belabored by germs from without, or constantly bathed in blood loaded with poison from the intestinal tract, the kidneys, gums, throat, or other source, it is gratifying to make daily comparative tests and watch the improvement millimeter by millimeter with effectual elimination and constructive heart treatment. In no other way could the change be noted with such confidence.

Of course this test is applicable to only a limited number of cases of heart disease in the terminal stage. But here it is not needed in the face of such symptoms as pulsating jugulars, the difficulties of respiration, cyanosis, enlargement, dropsy, auricular fibrillation, heart block and other signs plainly evident. In well selected cases in this class and in patients where compensation has been established it will be found valuable.

In a large number and wide range of cases this test has been found so uniformly serviceable that it is strongly commended with the greatest confidence and with the feeling that the subject has not had the attention it deserves.

DISCUSSION.

Dr. John L. Davis, Waco, Texas.—There is only one indictment we can always bring against

Dr. Lankford when he presents these scholarly, classical papers. A good many of us feel we are on the firing line, but we always find Dr. Lankford a few steps in advance of us. He is a remarkably thorough student and close observer, and none of us can fail to endorse, as far as we understand and know, all the statements he has made in this splendid paper. I certainly endorse strongly his method of examining for impairment of the heart, as shown in the blood pressure instrument under exercise. But there is a whole lot that is theoretical and is hardly practical as yet, because we must remember that taking blood pressure through the use of the sphygmomanometer is a very recent procedure, and the ordinary physician, the every-day doctor, has yet had hardly enough experience to make his examinations anywhere nearly as accurate as such a scholarly observer as Dr. Lankford will ascertain from his own work. The blood pressure instrument in my judgment is one of the most valuable instruments of precision in diagnosis we have today. It is useful for the clinician and very useful for the medical examiner in life insurance, in which department of work most of my energy has recently been exerted. We all feel that its findings are wonderfully valuable for our insurance companies, but for every-day observation of these blood readings, as they are presented by the ordinary examiner, we have got to be satisfied with something that we know is only approximately accurate. The insurance company with which I am connected, as well as other leading companies, is carrying on a campaign of education among examiners for instruction along the lines of using this most valuable instrument, and we are getting exceedingly good results, from a commercial standpoint; that is what insurance men are in the business for; so that we have to make these careful observations. In the company with which I am connected we have already readings in six thousand cases and these will soon be tabulated and given to the profession, so we may profit by the use of this instrument, which is endorsed by the leading physicians and leading insurance directors of the company.

I am pleased to endorse everything the doctor has said so clearly.

Dr. Lankford (closing).—The program is so full and valuable that I will not take up your time further except to emphasize the point that in the face of doubt and difficulty in diagnosis and prognosis of heart disease nothing has ever given me such assurance and comfort as this test. A thorough trial will demonstrate its usefulness in many different conditions, and I trust the paper has at least aroused some interest in the subject.

A NEW AND IMPROVED METHOD FOR TREATING OPIUM-MORPHINE ADDICTION.*

By S. T. Rucker, M.D.
Memphis, Tenn.

The Harrison "narcotic law" having caused a largely increased number of "drug users" to apply to physicians for relief, I feel it an opportune time to offer to the profession an improved method of treatment for drug addiction, based on rational procedures, the results of which have been uniformly good. The horrors and intense suffering incident to discontinuing the use of opium-morphine are eliminated. The patient is kept in bed, asleep or drowsy for two days and a night, after which a fairly rapid convalescence takes place.

Almost every drug in the materia-medica has been used, or recommended, to treat opium-morphine addiction. Belladonna and hyociamus were early used and found favor with some physicians. These drugs and their alkaloids are still relied on, mainly to lessen the pains and suffering a patient goes through when the opiate is discontinued entirely. Some ten years ago I tried out thoroughly these drugs in treating opium-morphine addiction and found them uncertain and unsatisfactory. I soon abandoned their use, except to use atropine in the "after-treatment."

The habitual use of opium lessens activity of the secretory and excretory organs, inhibits intestinal peristalsis and disturbs the process of metabolism, hence diaphoretics, diuretics and purgatives are indispensable in treating the withdrawal symptoms.

The treatment I use may be divided into (1) Preliminary, (2) Special, and (3) After-Treatment.

1. When a patient presents himself for treatment, a conference is had with him to ascertain something of his character, motives and the amount of drug used. He is examined physically and a laboratory examination of the blood and urine is made. If he is using two grains or

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less of morphine per day, and his condition is good, he is given purgatives for two or three successive nights, an electric light bath every day and is put to sleep the third or fourth day after he enters for treatment. If a large amount of morphine has been taken for years, the preliminary treatment is extended to one or two weeks, according to the condition and needs of the patient. He is given a purgative of 5 to 10 grains of calomel and soda and two or three pills containing aloin, strychnine and Belladonna at about 8 p. m. every other night and the electric light bath every other day. The drug is also reduced every other day. If the daily dose is 10 to 15 grains of morphine, he is reduced to 6 or 7 grains first cut, then say 1 grain reduction until about 2 grains are reached.

2. Then the special treatment may be given, which is carefully carried out as follows: On the afternoon preceding the special treatment, 10 grains of calomel and soda, 10 grains compound Jalap powder and two or three pills containing aloin, strychnine and Belladonna are given at 5 p. m. The last dose of morphine is given not later than 6 p. m. the same day. No supper is given. At 8 p. m. I give 15 grains calomel and soda, 10 grains compound Jalap powder and three of the aloin, strychnine and Belladonna pills. The patient is left alone until 6 a. m. next day (first day of special treatment) when Epsom salts or some active effervescing saline is given in a tumbler of water. The patient is given a warm tub bath about 6:30 a. m. and put to bed in a different room from the one previously occupied. And the room vacated, also the clothes of the patient carefully searched some time during the day for any drug he might have secreted. At 7 a.m. 30 to 35 grains of trional are given, followed by a glass of hot sweet milk. At 10 a. m. and 2 p. m. the same size dose of trional is given, if the patient is awake, followed by the hot sweet milk. If patient is asleep when time for second and third doses of trional comes, one should wait until he awakens himself, then give the trional powder.

The patient is kept in bed, shades down and room darkened and a special nurse assigned to care for him and give treatment for two or three days, or longer if necessary. Nurse is instructed to keep things quiet in patient's room and give water or milk when the patient is wide awake, and feel his pulse occasionally. No one is allowed to see the patient during the special treatment, except the doctor and nurse.

At 6 a. m. the second day 90 grains of bromide soda is given in a tumbler of water. At 10 a. m. and 2 p. m. 60 to 90 grains of bromide soda are given in a tumbler of water if patient is awake. The patient is kept in bed the second day and the room kept darkened and quiet. Physician should go in to see how the patient is doing at least twice a day.

At 8 p. m. the second night 5 grains of calomel and soda and two or three aloin, strychnine and Belladonna pills are given with 7 or 8 grains of veronal.

3. At 6 a. m. the third day the after-treatment is begun with a saline in a tumbler of water. A tonic prescription of fluid extract cimicifuga 6 drams, avena sativa 9 drams and aromatic elixir enough to make 3 ounces, one teaspoonful in water is given at 7 and 10 a. m. and 2 and 5 p. m. I also give hypodermically strychnine nitrate gr. 1-30 and atropine sulphate gr. 1-100 at 8, 12 and 5 p. m. These drugs are given in reduced dosage for two or three weeks. The patient is allowed to get up on the third day, if he feels like it. Baths are begun and continued every other day. Light regular meals are allowed on the third day and increased as the patient's appetite gets better. As a rule, the patient improves fast and soon feels better than when taking opiates.

Drug users can stand large doses of purgative medicines. Calomel will not salivate when combined with other purgatives and followed by a saline to properly work it out of the intestines. The gums may become a little tender, but this will pass away in a few days. Drug patients will also tolerate large doses of hypnotics and will take 90 to 100 grains of trional (in three doses) during the first day of the special treatment without bad effects. Anuria occurred in one patient, but I believe this was due to the patient's condition, rather than to the trional. I consider trional a safer drug to use than veronal. The electric light bath is extremely useful. It is a powerful stimu-

lant to the general circulation of blood and increases the action of the skin and kidneys, thereby promoting elimination of metabolic waste. It is also calmative to the nervous system and induces sleep. I have taken patients off of morphine without giving the electric light bath, but they do so much better with it that the electric light bath is part of my routine treatment.

Complications and suffering, if any, occurring during or after the withdrawal period, are due either to neglect in strictly carrying out the plan of treatment, or to some inter-current bodily ailment. In some patients, minor aches or pains may be caused by a bad tooth, a neuralgic diathesis and intestinal stasis. Such conditions, when they arise, must be treated symptomatically and by such remedies as the judgment of the physician may prompt. Some patients will go through treatment without complaint, and it is seldom that one will ask for an opiate.

The psychic side of treatment must not be ignored. There is marked psychic deterioration in some drug users. They develop a weak will, a lack of self-confidence, a fear of suffering and a tendency to falsify. Ethical ideas depreciate, and the moral standard is lower. This class of patients should be taught how to discipline and control the emotions, how to re-educate confidence and will power and be urged to cultivate the ability to endure bodily ills and discomforts, like persons who do not use opiates, instead of resorting to drugs to relieve every little ache or pain.

Finally, I will say that while this method of treatment is safe and a success when properly carried out, like other good things, it is capable of producing harm in the hands of the careless or ignorant. The treatment can best be administered in hospitals and sanitariums where nurses, baths and other necessary facilities are available, and by physicians who will take the time to thoroughly familiarize themselves with the method of treatment and who will take the pains to see that every detail of treatment is carefully carried out.

Goodwyn Institute.

PYELITIS IN INFANCY AND EARLY CHILDHOOD.*

By L. R. DeBuys, M.D.
Assistant Professor in the School of Medicine and Assistant Professor in the Post-Graduate School of Medicine of Tulane University, New Orleans, La.

Pyelitis, as its name implies, is an inflammatory condition of the pelvis of the kidney occurring most frequently in infancy and early childhood and recognized in direct proportion to the thoroughness of the examination of the little patients and the completeness of the examination of their urines.

It may be caused by several etiological factors, namely: 1, calculus irritation; 2, drugs, as, for example, turpentine, carbolic acid, salicylic acid and cantharides; 3, toxins, as is found in the acute infectious diseases; and 4, bacterial infections. The first of these is very rare at this time of life; the second is also rarely responsible for the disease; the third is seldom recognized, probably due to infrequent urinary observations in the acute diseases, the cause of sudden rises in temperature being looked upon as always belonging to the disease, though urinary examinations if made during acute rises of temperature, particularly during defervescence and convalescence, will frequently reveal a pyelitis as the exciting cause. It is more particularly with the last that this paper is concerned.

Bacterial infections causing pyelitis are believed to gain entrance into the pelvis of the kidney by three routes: first, through the blood; second, through the lymphatics; and third, by direct extension from below upwards via the urethra, bladder, and ureters. The first of these has not been proven, but it is believed to be the explanation in those cases where male infants and small children without any evidences of cystitis or local inflammation of the genital tract are sufferers of this condition, but when there is a breach of continuity of the mucus or muco-cutaneous surface allowing of an

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atrium through which the organisms are taken up by the blood stream and eliminated by the kidneys. The second route remains also unproven, but again in male patients with no evidences of cystitis or local inflammation of the genital tract, nor of loss of continuity of the mucous or muco-cutaneous surfaces, but who have pyelitis, the lymphatic system is credited as the route of infection. This evidence is intensified when the frequency of intestinal trouble associated with pyelitis is recognized in the history of these patients. The greater relative frequency of the infection of the right kidney in the adult seems to add weight to the theory of this method of infection upon the explanation of the close relation anatomically between this kidney and the ascending colon, caecum, and appendix. These two routes may also in some instances be the way by which the female may become infected.

The third route, by direct extension from below upward, is by far the most frequent way by which the bacteria gain entrance into the pelvis of the kidney. In corroboration of this may be cited: First, the greater frequency of the disease in the female; second, the anatomical arrangement in the female, more pronounced at this time of life; third, the delayed changing of soiled diapers, the vulva being allowed to become buttered with the stool; fourth, ignorance in the hygiene of the soiled child: attempting to cleanse the child with the soiled diaper, using that part of the diaper already used on the anus and buttocks for wiping the vulva, all resulting in the production of a vulvitis or urethritis which is the atrium of infection. In substantiation of this, the organisms preponderating in the infection are found in the bowel.

In the vast majority between 80% and 90% of cases of pyelitis the offending organism is the B coli communis which is usually found in pure culture in the urine. Occasionally other organs are found in the urine of typical cases of B coli infections, which organisms do not affect the course of the disease; and again the infection may be mixed, fortunately in a very small minority of cases, with pyogenic cocci, in which instances the disease is more obstinate in response to treatment. Most of the organisms other than the B coli communis which infect the urinary tract in infancy and childhood also belong in the colon-typhoid group.

The urine is usually markedly acid and cloudy. The specific gravity depending upon the output which is diminished in quantity. It contains a variable amount of pus and a little albumen which is due to the pus, and occasionally a few red blood corpuscles may be found, some epithelial cells from the pelvis and ureters, and the bladder if it is involved, and many bacteria. Filtering of the urine does not remove its turbidity, as it is due to the organisms, which pass through the filter paper, the pus cells remaining on the filter paper.

The majority of cases occur under three years, and of these most of them under two. In from 90% to 96% of the cases females are affected. It is highly probable that much of the trouble in the adult female kidney may have origin in the infections of the kidney during infancy and childhood.

Pyelitis may be primary or it may be secondary to a cystitis. In the acute cases there is found swelling of the mucous membrane and sometimes minute hemorrhages. In those cases which continue there is usually an extension into the kidney, causing a pyelo-nephritis.

The onset of pyelitis is sudden with chills and high temperature. These chills may recur or there may be only blueness and cold extremities. The fever fluctuates widely from 100° to 106½° Fahrenheit, and there may be intervals of apyrexia. The high rises of temperature may occur daily or there may be several rises during the twenty-four hours. During the periods of apyrexia the patient may not appear at all ill. There may be anorexia, nausea and vomiting, irritability and restlessness and pain spasmodic in character, and tenderness may be found over the affected kidney, usually the right, and there may be a diarrhoea. In many instances the appetite remains unimpaired and the bowels regular. Sweating is a frequent symptom and is profuse in some cases. Frequent micturition and tenesmus is found in those cases complicated with cystitis. Splenic enlargement is not an uncommon occurrence and there may be a secondary anemia in the cases of prolonged duration. The blood shows

the evidences of inflammation, there being a leucocytosis of moderate or marked degree, and the differential count shows a great increase in the polymorphonuclear cells.

Sometimes irritability, extreme pallor and an occasional fever may be the only symptoms. In these cases, however, it is probable that there may be a history of an acute attack at some time previous. Rarely convulsions, opisthotonos, coma, high fever with evidences of uremia or sepsis with a fatal ending, may occur.

The urine at first shows a bacilluria and later pus, varying in quantity and epithelial cells from the various parts of the urinary tract involved.

Pyelitis may last from a few days to six weeks or it may become chronic or progress to a pyelo-nephritis or a pyonephrosis.

The diagnosis of pyelitis depends upon the chills, characteristic fever, blood picture, scanty urine, and pyuria. If to these are added pain and tenderness over the kidney the picture is complete. In acute illnesses in infancy and childhood the examination of urine should be as much of a routine measure as auscultation of the heart, and directions should always be given how to secure the specimen as free from contamination as possible. If, in the examination of the urine, pus is found, another specimen should be secured under strict aseptic conditions by catheterization if the patient is a female, or if a male, by the use of a test tube or bottle attached by means of a finger cot and adhesive plaster to the patient. This specimen should be examined both microscopically and culturally. In cases of illness where there is a chill and high temperature this carefully collected specimen should be secured at the earliest possible moment. In this way it will be noted that the offending bacteria may be present before the pus is found and this will allow of a prompt diagnosis and an early preparation of an autogenous vaccine. After pus has formed in the pelvis of the kidney its presence can be demonstrated in the urine. It is possible that the urine upon examination in cases of pyelitis may occasionally contain no pus and no bacteria. This is due to a temporary blocking of the ureter on the affected side. It is well, therefore, that a negative diagnosis of pyelitis should not be made from only one examination of urine. Because of the infrequency of chills at this time of life and because they are caused almost always by pyelitis it is justifiable to make further catheterizations when negative urines are found.

In adopting the foregoing plan the duration of many cases of pyelitis may be shortened by early recognition and prompt treatment, and the cases which do not respond may have the advantages of early autogenous vaccine therapy.

The outcome of these cases is usually good, the danger being in an extension of the process into the kidney, producing a pyelonephritis and pyonephrosis.

The treatment of pyelitis may be included under four groupings: First, drugs; second, irrigation of the pelvis by direct method; third, irrigation of the pelvis by indirect method; and fourth, vaccines.

1. DRUGS.—Many drugs have been advocated for use in pyelitis, among them urotropin, potassium citrate, methylene blue, crosote and salol. Of these urotropin and potassium citrate are the most frequently employed. Urotropin is best given early and in large doses—2 to 3 grains every three or four hours to a child from one to two years of age. It is given for the antiseptic property of the formaldehyde liberated in the urine. Unless the urine is acid and the urotropin breaks up there is no use giving it. A simple and delicate test for formaldehyde is the phloroglucin test as described by T. D. Austin in the New York Medical Journal March 28, 1914. It is a 1% solution of phloroglucin in 15% sodium hydrate. By adding 5cc of urine to 1cc of the reagent a color varying from a blood red to a trace of pink is shown, depending upon the dilution of the formaldehyde. By floating the urine on the reagent it is possible to detect the smaller traces more readily, the blood red representing a 1 part in 1,000 and the trace of pink a dilution of 1 part in 10,000,000.

Potassium citrate is given in order to alkalinize the urine and thereby hinder the growth of the B coli communis, the most frequent offender. It also must be given in large doses, from 24 to 48 grains daily, to a child from one to two years old in order to produce the desired effect.

As the bacteria may become accustomed to a continued reaction, alternating the two foregoing drugs at times may be efficient, in which event it is necessary to watch the raction of the urine closely. It may be alkalinized readily with the potassium citrate, but to change the reaction from alkaline to acid it is necessary to use some drug other than urotropin. Benzoic acid, one or two grains every three or four hours to a child from one to two years of age, will accomplish this. It should not be used in combination with the urotropin in prescriptions, as the urotropin may break up before ingestion or in the stomach and cause gastric symptoms.

Methylene blue and creosote for their antiseptic properties and salicylic acid excreted as a phenyl compound may sometimes be of benefit, but are rarely used.

2. The direct method of irrigating the pelvis of the kidney has been shown in the adult to be the most efficient means of combating a pyelitis and its results are spectacular, but unfortunately infants and small children are handicapped by being deprived of this excellent therapeutic measure because of the relative size of the instruments and the parts of the patients.

3. By far the most reliable measure of treating pyelitis in the small patient is by irrigation of the pelvis of the kidney by indirect method. By this is meant the giving of large quantities of liquids. It is well to dilute their food so that they may be always hungry and in order to satisfy their hunger they must take large quantities of fluids to receive a sufficient quantity of nutriment. It is well to give them fluids regularly day and night at intervals of two hours or shorter. In this way the pelves of the kidneys are kept clean and the pus is constantly diluted and washed out, preventing the formation of large masses of pus and thereby diminishing the frequency of the plugging of the ureters with the incident high rises of temperature. In this way also many cases of pyelitis in infancy and early childhood are kept relatively free from fever and comfortable throughout the disease, their resistance improved and their convalescence shortened.

4. Vaccines are sometimes of benefit and should be autogenous. Their effect is not uniform and reliable, but in some instances has been of advantage. They should be given in doses beginning with 50,000,000 and increasing rapidly to 200,000,000 or even 250,000,000, the interval varying from three to five days, depending upon the reaction of the patient and the recovery from the reaction. In the resistant cases and the chronic cases the autogenous vaccine is more especially indicated. Should the vaccine not produce after from three to five vaccinations an immunity as shown by the bactericidal property of the blood, its use should be discontinued.

DISCUSSION.

Dr. J. Ross Snyder, Birmingham, Ala.—I move that the privileges of the floor be extended to Dr. Gegenbach, of Denver, Colo. Seconded and carried.

Dr. Frank P. Gegenbach, Denver, Colo.—Dr. DeBuys has covered the ground so thoroughly in his paper that all I can do is to impress one or two points. It is well to remember that both pyelitis and pyelocystitis, while perhaps not so frequent, are fairly frequent as causes of so-called obscure febrile diseases in children. We had to harp for a long time on otitis media because practitioners would not routinely examine the ears, but now that they are educated to do so, they are looking for otitis media as an obscure cause of fever in children. We will also have to educate the practitioner along the line of examination of the urine as that is the only way we can make the diagnosis to a certainty. A routine examination in children is just as essential as in adults.

As regards the treatment, I want to add that in my experience I have had a little better success with the use of citrate of sodium rather than citrate of potash, and also in the use of indirect irrigation I not only give large amounts of liquids by the mouth, but routinely irrigate the bowels once or twice a day with normal salt solution, to which I add citrate or bicarbonate of soda.

Dr. Rogers Hays, North Carrollton, Miss.—The blood picture in these conditions is very valuable. Often examination of the urine fails to show pus. In two cases I have seen the urinalysis show normal urine, but the blood picture was that of a marked leucocytosis. Operation revealed an occluded ureter, the normal urine coming from a healthy kidney. If urinary examination fails to disclose pus when the blood picture shows marked leucocytosis we should not forget a possible occluded ureter.

Dr. J. Spencer Davis, Dallas, Texas.—In those cases associated with chills, the diagnosis formerly made was malaria, especially if the chills were repeated. Since the microscope has come into general use we do not find this diagnosis so frequently made. The mere presence of bacteria in the urine is not sufficient evidence to make a diagnosis of pyelitis, as bacteria are found in

freshly passed urine without there being any inflammation of the pelvis of the kidney.

All our attention should not be centered upon the kidney, but due attention should be given the intestinal tract. Frequently the pyelitis clears up after cleaning out the intestinal tract, preferably with mild mercurial, followed by something like cascara. Very small doses of calomel are a decided help in treating this type of case.

Dr. L. W. Elias, Asheville, N. C.—As to examination of the urine, some of us simply examine it for albumin, and this may not show the presence of pus. But we must use the microscope to tell us whether the child has pyelitis or not.

In reference to the use of urotropin, Dr. Freeman, of New York, contends that we do not use large enough doses. We can give a baby a year or two of age a dram in twenty-four hours, watching the effect on the kidney. Where kidney irritation results the picture is most alarming in that you get the urine full of casts and albumin. Simply stop the drug and in twenty-four hours these symptoms all clear up. One may succeed by giving large doses where small ones failed.

Dr. John M. Cooper, Enid, Okla.—In order to emphasize the remarks of the last gentleman with regard to examining the urine under the microscope, I want to relate one case.

A general practitioner brought a sample of urine from a little baby to my office for examination. On questioning him he told me that he had made what he called a complete chemical examination of the urine. This child gave a history similar to that given by the essayist. The child was brought from Texas to Oklahoma early last spring. If I remember correctly, going back to the point of examining the urine under the microscope, I insisted upon a specimen of the urine, and upon examination with the microscope we found the general characteristics of pyelitis in the urine together with colon bacilli, and fearing some mistake might have been made, we decided to test it a second time, and with the same result.

The next point I want to make is the success that we have had in this particular case by a colon vaccine. I have used a great deal of the vaccine, and I must confess I never saw any case of colon baccilus infection clear up in as short a time as this one did, together with the use of urotropin, and with large quantities of water by the mouth.

Dr. H. L. Moore, Dallas, Texas.—It has taken me many years to learn this one point, that is, in any case of remittent or intermittent fever in a child under three years of age, always remember the possibility of pyelitis, especially if the child is a female; then get busy and make your differential diagnosis.

Dr. Philip F. Barbour, Louisville, Ky.—I would like for Dr. DeBuys to express his opinion on one phase of his subject. I have frequently found pus in the urine of children after centrifuging the urine and yet the cases have not been such as I would diagnose clinically as pyelitis. I have seen cases in which the removal of the focus of infection, whether in the bowel, the tonsil, or the middle ear, would entirely clear up the pus from the urine. I have felt that such cases were not really cases of pyelitis, but one is often at a loss to decide whether there is a real infection in the kidney or whether it is secondary to some primary focus.

I am really opposed to the use of urotropin in cases of pyelitis; my experience has been unpleasant when I have used large doses of urotropin, and I would not think of giving a child a dram and a half per diem. I have sometimes found that a child will pass blood and have a good deal of dysuria after the administration of urotropin even in small doses. I prefer the citrate of potash to any other treatment, and I have not had the same unpleasant symptoms with it that I have had with formaldehyde preparations.

Dr. William L. Moore, Tallahassee, Fla.—I do not wish to discuss the paper at all of Dr. DeBuys, but there is one question I would like to ask him to answer, and that is as to the differential count in these cases. He mentioned that as one point in making the diagnosis. My experience has been that the differential count in children varies very much, even in apparently normal children, and I would like to have that point brought out clearly.

Dr. L. R. DeBuys, New Orleans, La. (closing.)—I want to thank the members of the Section for their very generous discussion.

In reply to the first question relative to there being no pus, I stated rather emphatically, I think, that we should not eliminate pyelitis as a possibility in a child where there is a chill and fever upon one examination of urine. Blocking of the ureter may occasion the absence of pus in one examination.

As to the next point, in my experience chills are not very frequent in infancy and early childhood from malaria. We find there may be a blueness of the skin in the child with coldness of the extremities, but when I see a chill in an infant I must be convinced it is not pyelitis.

Urotropin given in pyelitis in adults or in children, or in no matter what other disease it may be, should be given with very close observation made of the urine. I have seen some irritation of the kidneys due to urotropin and by discontinuing this drug the evidences of irritation, albumen and casts have disappeared. Pus cells in groups in the urine are what I depend upon for diagnosis in urine examinations. A routine or casual examination should be made and if pus is present, no time should be lost in securing a proper specimen for microscopic and bacteriologic examination.

A differential blood count in infancy is different from that in the adult. The lymphocytes are relatively in larger quantities in early infancy and childhood, and 70% polymorphonuclear count is quite a high one in infants or children under three years of age.

A CRITICAL STUDY OF THE WASSERMANN AND LUETIN REACTIONS DONE SIMULTANEOUSLY ON 500 CASES.*

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The following report is based principally upon some as yet unfinished investigations in which we were engaged at the University of Texas Medical School at Galveston. The object of these is to determine the percentage of the negro race which is infected with syphilis. The present paper, therefore, is simply a branch, as it were, of this work, but we feel that such a report is justifiable for several reasons, chief of which is the vital interest of both of these reactions to the profession as a whole, and more especially since some doubt has recently been cast upon the specificity of the luetin reaction, particularly by Sherrick, of Minnesota. (J. A. M. A., 1915, LXV 399.)

Before reporting the details of our observations it would perhaps be well to describe briefly the technique which we have employed. The Wassermanns in the following cases were done according to Noguchi's technique, using the anti-human hemolytic system instead of the anti-sheep system of the original Wassermann test. The blood for the Wassermanns is taken and the luetin given to every negro patient admitted to the John Sealy Hospital as a routine. This is done as soon after admission as possible. The luetin is given according to Noguchi's technique, namely: 0.07cc, or about two minims, intradermically. The luetin used in the majority of these tests was obtained from the Rockefeller Institute for Medical Research through the kindness of Dr. Noguchi, to whom we wish now to express our appreciation. The remainder was obtained from H. K. Mulford & Co. All of these tests, both the luetins and the Wassermanns, were done and interpreted by myself. In interpreting both of these reactions we have endeavored to be as conservative as possible, calling only those Wassermanns positive which showed a fixation of at least 75%. We have considered only those luetins positive which showed a definite, indurated papule of at least 4mms diameter, which persisted for at least four days after the injection. The majority of our positive luetins were clear-cut and offered no room for doubt. There was a certain unpleasant number of borderline cases, however, in which we were in doubt. These we have considered negative. The most troublesome luetin for us to interpret has been a small (2-4 mms.), hard, indurated papule with little or no redness or inflammatory reaction, lasting for a day or so and then disappearing. Another confusing reaction which we have noticed, especially with the luetin furnished by Mulford, has been a small, pinhead sized, seropurulent bleb, appearing usually about twelve hours after the injection and persisting usually for one or two days. There is no inflammatory areola about these blebs, nor is there, as a rule, any induration. We have been unable to determine any relation between these reactions and syphilis. Our feeling is that they are probably bacterial in origin. Regarding bacterial infection in the luetin reactions: unless the lesions just described were bacterial we have had but two such infections. Both of these were typical abscesses, containing pus and staphylococci, and could in no way be confused with a positive luetin reaction. In all of our luetins we have sterilized the skin before injecting with 95% alcohol alone. In both of the cases in which infection occurred the luetin used in the test had been kept in a warm room for several days. It is only necessary to see one such case of infection in order to be able to distinguish it readily from a positive luetin reaction.

In the following report we shall attempt to study several features of our reactions. First, the relation of the positive luetins to the positive Wassermanns. Second, can the luetin be used as a substitute for the Wassermann reaction? Third, is the luetin reaction specific? Fourth, is the Wassermann reaction specific? Before proceeding further I wish to present the following protocol of our cases:

*Read in Section on Medicine, Southern Medical Association, Ninth Annual Meeting, Dallas, Texas, Nov. 8-11, 1915.

PROTOCOL NO. 1

Wassermanns and luetins on the same patient at the same time

Total number positive Wassermanns	138
Total number positive luetins	111
Both Wassermanns and luetins positive	66
Both Wassermans and luetins negative	317
Positive Wassermanns and negative luetins	72
Positive luetins and negative Wassemanns	45

At first glance at these tables the most striking characteristic is the comparatively small number of cases which show a positive reaction to both the Wassermann and the luetin reaction. Only about half of our positive cases showed a positive reaction to both tests.* There were more positive Wassermanns than positive luetins. Regarding the complementary value of these tests we have been especially interested. What percentage of the so-called doubtful Wassermanns will be cleared up by a positive luetin? Our experience has been that the two reactions are, in fact, of considerable complementary value. About one-third of our doubtful Wassermanns were on patients who gave positive luetins, while about the same number giving doubtful luetins gave positive Wassermanns.

Regarding the negative luetin reactions in those who are clinically syphilitic, we are able to substantiate the findings of all who have had much experience with this test, namely, that the luetin is apt to be negative in untreated primary or secondary syphilis, while the Wassermann is usually more strongly positive at this stage than at any other time. The incidence of the positive luetins varies, therefore, directly with the age of the infection, while the incidence of the positive Wassermanns varies inversely with the age of the infection. We have also noted another point in regard to the luetin reaction in syphilitics which we have not heretofore seen mentioned. This is a phenomenon somewhat resembling the negative tuberculin (Von Pirquet) reactions in patients who are very far advanced in the disease of tuberculosis. We have noted a number of cases of undoubted syphilitics in all stages of the disease, including the tertiary, who were greatly emaciated or who were about to succumb to the disease, in whom the luetin reaction was entirely negative. Such cases will, however, give a good Wassermann reaction almost invariably. Concerning, therefore, the first question which we have attempted, namely, the relation of the positive luetin to the positive Wassermann reaction, and of both to the clinical findings, we have found the following to be true in this series of cases. Practically all cases of known clinical syphilis react positively to either the Wassermann or the luetin reactions. A negative reaction to both tests, while not absolutely ruling out syphilis, is, of course, of much more value than a negative reaction to either test separately. A negative Wassermann reaction is of much more significance than a negative luetin reaction. The Wassermann reaction is of much greater value than the luetin reaction in the diagnosis of syphilis.

Regarding the question of whether the luetin test is specific for syphilis, we have been particularly interested recently. Until a few months ago the luetin reaction, so far as I am aware, has been regarded by every one who has used it at all frequently as specific for syphilis alone. Recently, however, several observers have reported that positive reactions could be obtained in syphilitics by the injection into the skin of other substances than luetin. Positive reactions could be obtained with ordinary liver extract, with peptone, agar-agar and other proteids instead of the extract of the spirochaeta pallida. These reactions were not, however, so marked as a rule as were those given by the pallida extract. Sherrick has, moreover, recently reported that he is able to obtain a positive luetin in 99% of all individuals, regardless of whether they have syphilis or not, by the preliminary administration of potassium iodide in sufficient quantities (40 to 60 grains per day for several days). We had ourselves, at one time, been great believers in the so-called provocative treatment for bringing out a positive luetin in a suspected case. To a suspected or doubtful case who had given a negative or a doubtful luetin, and who we thought ought to have a positive one, we would give potassium iodide and mercury for several days, usually a week, and then do another luetin. This procedure we found so exceedingly satisfactory, and our clinical judgment was proven correct in so many cases, that

*Approximately 25% of these had had potassium iodide before or during the test.

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we ourselves had begun to suspect that our diagnostic ability was too good to be true, when Sherrick published a report of his cases.

During the past several months we have been endeavoring to either confirm or refute the claims of Sherrick experimentally. Our experiments were conducted as follows: First, all cases in whom we were able to investigate the medication before and during the administration of the luetin were investigated. This series consisted of about four hundred cases. A glance at our second protocol, consisting of the four hundred cases which we have been able to study in such a manner, will show that the majority of our positive luetins were on patients who had had potassium iodide at some time before the interpretation of the test. We have also found the delayed reaction to have been frequently present in these treated cases. The second step in our investigation of the effects of potassium iodide has been to select all cases admitted who had negative Wassermanns and who had no clinical signs of syphilis. An absolutely negative history was obtained in all. This series consists of some thirty patients. After the negative luetin had been obtained we waited two weeks and then began the administration of potassium iodide, 15 grains t.i.d., increasing in some cases to 30 grains t.i.d. All of this series gave positive reactions, and all except five gave severe reactions. Finally the test was done on myself in the same way and a beautiful positive reaction obtained, while several previous ones had been negative. We have been able in a few of these cases (six) to do still another luetin test several weeks after the positive one had been obtained, and after the potassium iodide had been discontinued. Three of these six cases gave good positive reactions one week after the discontinuance of the potassium iodide. One gave a weak positive reaction. Four of the six were negative to the luetin test two weeks after the discontinuance of the medication, while two were still positive. One was still positive at the end of the fourth week, becoming negative after six weeks, however.

PROTOCOL NO. 2

The relation of positive luetin reactions to the administration of potassium iodide and to the presence of clinical syphilis, in 400 cases:

		No. having K. I.
Syphilitics with positive luetins	72	37
Syphilitics with negative luetins	42	2
Clinical non-syphilitics with pos. luetins	59*	36
Clinical non-syphilitics with neg. luetins	227	6

*Including 30 selected cases of non-syphilitics.

PROTOCOL NO. 3

Total number of patients having K. I.* during the luetin test or before the test	81
Number giving positive luetins	68
Number giving negative luetins	13***

*We have considered only those cases having grs. XX. or more per day.

The question immediately arises, as a result of such findings, as to whether the luetin reaction has any value at all. A study of our cases, and of many others reported, will, however, show that many do react to the luetin without the exhibition of any medicines whatever, and that the majority of cases so reacting give strong evidences of clinical syphilis. As we have said, syphilitic individuals may react to the injection into the skin of many foreign substances, while a normal individual will fail to react. In the same way patients saturated with potassum iodide will react to many other substances than luetin which are injected into the skin. It would seem possible, therefore, as has been suggested by others, that the infection with the spirochaeta pallida produces a special change or sensitization of the skin analogous to that produced by the action of potassium iodide. Regarding the reaction of the skin during the administration of other medicines we are unable to speak definitely. We feel sure, however, from our statistics, that neither mercury nor salvarsan alone will produce a positive reaction. We have noticed in the study of our medications, however, that a number of otherwise negative patients had been on protiodide of mercury for some time before the luetin was obtained. As a result of this work with the luetin reaction, therefore, and of a study of its relation to the administration of potassium iodide, we conclude that it is not a specific reaction for syphilis in the true sense of the word, but that, if the proper precautions are taken, especially as to the previous administrations of medicines, not only of potassium iodide but of all medicines, it is of value in the diagnosis of syphilis.

Finally, what conclusions have we drawn from this work as to the actual working value of the Wassermann reac-

tion? It is, in the first place, our belief that the Wassermann reaction is of great diagnostic value when properly done and interpreted. And by this I mean interpreted by the man who has studied the case, by the clinician, and done by a trained laboratory man with whom he is personally acquainted, and in whom he has confidence, and not by a man whom he has never seen and about whose methods he knows nothing. The joker in the statement, which is usually made by the laboratory men, and especially by the so-called "commercial laboratories," that "a positive Wassermann reaction means syphilis," is, in my opinion, the omission of a description of the technique used in the reaction. There are almost as many kinds of Wassermann techniques as there are stars in heaven. An investigation will show that hardly any two men do their Wassermanns alike. If it is borne in mind by the clinician that there is a personal element in the doing of a Wassermann reaction and that an accommodating laboratory man can by proper titration, or rather by improper titration of the reagents, make a negative or a doubtful reaction become positive at will, he will more readily realize, perhaps, the importance of a careful selection. Moreover, just as Wassermann techniques vary, so do the interpretations as to what constitute positive and negative reactions. The remedy for this state of affairs is, of course, a standardization of the Wassermann techniques, so that one technique can be used by all to the exclusion of all other methods. This remedy is perhaps distant, but will probably come. The other remedy, which all can apply, but which, unfortunately, too many do not apply, is the more careful consideration of clinical findings and of clinical judgment with a more careful selection of the laboratory man. In other words, the report of a positive Wasserman reaction should be considered as a symptom and not as a diagnosis in itself.

DISCUSSION.

Dr. J. J. Terrill, Temple, Texas.—I have been very much interested in this paper from a clinical standpoint. It is a paper well worth thinking of, and there are many points in it that deserve further emphasis. The doctor has mentioned the possible effect of potassium iodid in bringing out a positive luetin reaction. I wish to mention the possible effect of potassium iodid upon the Wassermann reaction. It has been taught that the administration of iodids and mercury will provoke a Wassermann reaction in cases that did not previously give it. We tried the administration of potassium iodid to provoke such a reaction, and it provoked so many of our patients we were uncertain about the results. So we took a series of ten individuals, with negative histories, and in which we got negative Wassermanns, and administered ten grains of potassium iodid every three days for several days, and had a Wasserman reaction, the blood being examined by the Nogouchi technic. We found, without exception, upon the first day after discontinuing the three-day treatment with potassium iodid the blood gave the same reaction. In other words, if one interprets with X's they would vary between 2 plus to complete fixation. In those individuals with negative Wassermanns previously and with negative histories, on leaving off the potassium iodid, these all cleared up at the end of five days and showed a negative reaction, and that has raised a strong doubt in my mind as to the value of the so-called provocative reaction. I simply offer that as a suggestion. If the provocative reaction is shown to be reliable, I feel a sufficient space of time, not less than seven, but better, fourteen days, should elapse after the use of potassium iodid or mercury before the Wassermann reaction is tested.

The question of the interpretation of the results of the Wassermann in my mind is either a positive or negative reaction. There is no question but that a doubtful reaction which is gotten ought to be regarded as such and re-examinations made and considered with the clinical history. Every Wassermann should be interpreted in the light of the clinical history. Any practitioner who allows a laboratory man to make a diagnosis of syphilis for him from the Wassermann reaction will get into shallow water and run into the rocks sooner or later.

A PLEA FOR UNIFORMITY IN THE WASSERMANN REACTION.*

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and

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The Wassermann reaction, one of our most valuable methods of establishing the existence or non-existence of syphilis in an individual under observation, has re-

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cently been criticised very severely by several members of the medical profession. These criticisms we acknowledge are just, and judging by the statistics presented mild, considering the great variation in the results.

Uhle and Mackinney (1) in a series of 107 tests on patients clinically free of syphilis, and with no history of syphilis, obtained a positive Wassermann reaction in from 2.6 to 18.1% of the cases examined. This work was done by ten different serologists.

In patients suffering with primary, secondary and tertiary syphilis in a series of several hundred cases, the positive results varied from 50% to 100%; and in a series of 168 cases five different serologists agreed in their findings in but 47% of the cases.

J. A. Fordyce (2) finds a very large percentage of Wassermann reports unreliable and places the blame more on the technique than on the reaction itself, which he considers of value.

Edward L. Keys, Jr. (3), concludes after a lengthy article that:

1. A negative Wassermann is not sufficient evidence of the cure or absence of syphilis.

2. A positive Wassermann unsupported by clinical evidence is not sufficient evidence of the presence of syphilis.

3. A positive Wassermann does not prohibit matrimony.

4. A negative Wassermann after salvarsan in the first year of the disease does not mean that the patient is cured, or that lesions will not reappear before the reaction again becomes positive.

5. The return of chancre, glands, eruption and positive Wassermann reaction a few months after control of the disease by salvarsan in its first few weeks does not prove reinfection.

M. F. Schlesinger (4) acknowledges wide discrepancies and attributes them to modifications in the technique or to technical errors on the part of the serologist.

Abraham L. Wolbarst (5) finds that three serologists agreed in their results in 42% of the cases, differed in 19%, and contradicted each other in 39%.

Chester T. Stone (6) deplores the fact that there is no standard in either reagent or technique for the Wassermann reaction, and speaks reluctantly of uniformity in results. He also says that the tendency is towards a greater percentage of positives, many of which are false. In closing he gives a long list of possibilities causing error.

Albert Faller (7) attributes the errors in great part to heating the serum during inactivation, or to the presence of natural antisheep amboceptor which exists in the patient's blood. Dr. Faller used the Hecht-Weinberg test and it was brought out in the discussion that each of the gentlemen discussing his paper used a different reaction or modification.

D. M. Kaplan (8) concludes:

1. The Wassermann reaction from a theoretical standpoint has very little in common with the side-chain theory of Ehrlich.

2. Technically, only unquestionably positive results are to be taken into consideration by the laboratory and by the clinician.

3. Practically, one should not consider a Wassermann reaction without obtaining a good history and a complete physical examination.

William Litterer (9) considers the technique of Wassermann the best, and says that errors are due to a lack of control and failure to standardize reagents.

From the above abstracts taken from the literature of the last two or three years it will be seen that every one who uses the Wassermann reaction constantly in their work meets with considerable variation in the results obtained from different laboratories, in some instances receiving a negative and a positive report on the same blood at the same time from two different workers.

Believing as we do that the members of the medical profession want accuracy above all else in laboratory work, we are going to present to them some of the methods now in use for performing the complement fixation test in syphilis. At the same time it must be remembered that these are only the recognized modifications, and that every serologist changes the technique to meet the requirements of his work.

At the head of the list would be placed the Wassermann reaction as suggested by Wassermann, Neisser and Bruck. In this reaction inactivated or heated patients' serum is used, together with the watery

or alcoholic antigen. This antigen is made from the liver of a syphilitic fœtus. The complement is derived from the guinea pig, and this is to be taken fresh on the day the test is performed. Sheep corpuscles and anti-sheep amboceptor derived from rabbits are used in the hemolytic system.

This test is known as the original Wassermann reaction, and all modifications are based on this original principle.

Dr. Noguchi, of the Rockefeller Institute, devised a system in which the patient's serum is not heated or inactivated, the antigen is an acetone insoluble lipoid, and this is used in conjunction with guinea pig serum, human corpuscles and paper impregnated with anti-human amboceptor derived from a rabbit. The claim for this test is that it does away with natural amboceptor existing in the patient's blood, thus rendering the test more accurate, and at the same time the amboceptor being dried on paper is more stable.

Bauer modifies the test so as to exclude the amboceptor, using only the natural anti-sheep amboceptor existing in the blood to be examined. This test has no advantage over the two above mentioned except that it can be performed very rapidly.

The Hecht-Weinberg modification aims at doing away with amboceptor and complement except the natural amboceptor and complement existing in the patient's blood. It also makes the test quantitative. An antigen containing proteins will give a positive result with this test in some cases free of syphilis.

Stern modifies the test so as to use no complement except that existing in the patient's blood. Complement is the most unreliable substance used in the test, and since the test is a complement fixation test, and we test for a fixed amount of complement, a test in which an unknown quantity is present has little value.

Sheep corpuscles are used in the hemolytic system.

Tchernogubou further simplifies the test, using in one modification an anti-human system collecting the blood in sodium citrate to prevent coagulation, and adding antigen to unite with its specific antibody and fix complement. Later an anti-human amboceptor is added to determine whether or not fixation has taken place.

The second modification of Tchernogubou uses normal amboceptor and complement, but instead of the human corpuscles the corpuscles of a guinea pig are used. This test is used in a great many places in the South. The results will vary a great deal because there is no way to balance the hemolytic system.

Browning and Mackenzie have described a system in which an anti-ox hemolytic system is used. The claim for this system is that there is very little anti-ox amboceptor in human blood; also, according to their technique, the test is made quantitative.

These represent a majority of the recognized complement fixation tests now in use to determine the presence or absence of syphilis, but it must be remembered, as was said earlier in this paper, that each observer has his own technique as regards volume, time of incubation, strength of amboceptor and selection of antigen.

The most common antigens being used at the present time are:

1. The specific antigen made from known syphilitic tissue, as heart or fœtal liver.
2. Acetone insoluble lipoid.
3. Non-specific antigen made from the hearts of guinea pigs or non-syphilitic human heart.
4. Cholesterin fortified antigen, which is a non-specific antigen to which a definite amount of cholesterin has been added.

It is distressing to think that a test as valuable as the Wassermann test should be subject to such wide variation as to material and technique, yet it is a fact; and contradictory reports result which reflect on the clinician as well as the serologist.

To our knowledge there are several men doing the Wassermann reaction using unheated serum, and in addition are adding complement. This first gives an excess of complement, and as they use crude alcoholic extract antigen, there is danger of a false positive or proteotrophic reaction.

It was my misfortune to have contradictory findings in two bloods which I examined during the last year. In both cases, however, the physician or surgeon in charge of the case was advised to collect a third specimen and mail it to Dr.

Albert Keidel, of Johns Hopkins Hospital, Baltimore, for further examination.

One of these cases was a woman from Atlanta, Ga., who had received a positive report just a few days before I saw her. My report was negative, and I immediately suggested to Dr. J. D. S. Davis that he send a specimen to Dr. Keidel. Dr. Keidel's report was also negative.

The other case was that of a man who had a secondary eruption six months before with positive Wassermann one month previous to my examination. His blood was strongly positive. Not satisfied with the result, he went to another serologist, who presented him with a negative report. His blood was sent to Dr. Keidel by the attending physician, the report coming back positive, and supporting his first two examinations.

We would conclude from our experience and from the foregoing study of the literature:

1. That the results obtained with the Wassermann reaction and its modifications are subject to wide variation.

2. That this variation is due to modifications in technique and to faulty technique.

3. That the members of the medical profession, judging by the reports taken from the literature, request some representative medical organization to take up the work of standardization and place the reaction on a firm basis with definite units of strength and volume, and standard readings to be used by all serologists.

327-328-329-330 *First National Bank Bldg.*

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DISCUSSION.

Dr. Lloyd Thompson, Hot Springs, Ark.—I have been very much interested in Dr. Watterston's paper for the reason that I have done considerable work with the Wassermann reaction. He did not tell us anything about the standardization of the Wassermann reaction, which I hoped he would do; nor did he tell us his technic, which I hoped he would do. It would be a good thing for the medical profession, and especially for serologists, if a standardized technic could be adopted and used by them throughout the country, but, as he suggests, that is a problem for the future to determine.

The technic which I proposed some time ago is, of course, to my mind the best there is. I will outline it briefly for your consideration. I use the anti-human system, but I do not use non-inactivated serum. I inactivate the serum the same as the original test for half an hour at 55° The antigen which I have used recently and have used most of the time is re-enforced antigen, which is the nearest approach to the ideal antigen we have yet had. Some investigators say, however, that this will give false results. I have not found it so when titration was correctly done. Titration is the most important point in doing a Wassermann reaction. The complement, amboceptor and antigen must be titrated, or the amboceptor must be titrated before each reaction. I have found that the complement in two or three guinea pigs varies but very little. I titrate the amboceptor before each reaction. I do not titrate as originally proposed; put in a given quantity of corpuscles and varying quantities of amboceptor and get the lowest amount of amboceptor which will produce complete hemolysis, using that as one unit and two units in the test. That is inaccurate. Instead, I use the pooled serum of a number of negative persons and titrate under the same conditions as the actual test is performed. I put in .1 c.c. of patient's serum which has been inactivated and the complement and the antigen and inactivate for half an hour and put in my amboceptor and corpuscles, and at the end of the required time the tube which shows complete hemolysis and has the least amount of amboceptor is the unit, and that unit is used for the test.

Dr. Brad A. Fowler, Brownwood, Texas.—I rise to endorse the suggestion of adopting a standardized method for arriving at results in the use of the Wassermann test. I have had the opportunity of sending specimens for Wassermann tests to different sections of the country, and at the same time, from the same subjects, got different reports.

This last spring I had the opportunity of visiting laboratories in New Orleans and in Atlanta, and I was in the Fordyce laboratory, as suggested by one of the gentlemen, and they had great trouble in supplying the gentlemen of their institutions with satisfactory Wassermann reports. The report you got from one would be favorable and from another unfavorable—one positive and another negative. So I rise to endorse heartily the suggestion that a commission be appointed by this Association so that they can come together on a Wassermann reaction that will be accepted.

Dr. Robert Wilson, Jr., Charleston, S. C.—There is nothing more important than the standardization of the Wassermann reaction. I think all of us appreciate the necessity for a standard method. I do not see the use of waiting for the future as Dr. Thompson suggests, and I rise to make a motion that the Medical Section recommend the appointment of a commission to report at the next meeting on the standardization of the Wassermann test.

Motion seconded by Dr. Roberts and carried.

Dr. Charles J. Watterston, Birmingham, Ala.—(Closing)—In reply to Dr. Thompson, who asks what reaction I use, I will say that I use the original Wassermann technique. I do not consider it objectionable to use a well balanced human hemolytic system or antigens other than the syphilitic liver extract provided the antigen is carefully titrated.

I believe a uniform Wassermann reaction is a necessity. The antigen and hemolytic system selected are matters to be settled by those arranging the test.

The antigens must be carefully titrated at frequent intervals and the hemolytic system must be well balanced before each test.

THE ARKANSAS HOT SPRINGS BATHS.*

By E. H. Martin, M.D.
Hot Springs, Ark.

The reason for this paper is the widespread lack of information on the subject which afflicts the medical profession.

Laymen may believe in results which they have merely seen or experienced, but usually doctors do not believe anything which they can not explain with the knowledge at their command. This is a very laudable attitude and as, until recently, nothing was known of any thermal waters except that they were warm or hot and had various unenlightening chemical constituents, it was but natural that the home doctor would attribute any benefit which a patient had gained by a trip to such a resort to the rest and change necessarily entailed.

The attitude of the home doctor when called upon for advice on the subject is usually one of amused tolerance. His advice is that the trip and change of scene may do the patient some good, but as for the water—well, it is just hot water. One can take hot baths at home just as well and as effectively, for is not hot water hot water everywhere?

This is far from being the case; in fact, it is to be regretted in a measure that these springs were ever named "Hot" Springs, or even that the water comes out of the earth hot (if it could have the same effects otherwise) or that anything of the sort should have given rise to the popular expression, "boiling out," or to the belief — lay and professional — that this is merely *hot* water.

The fact is that patients rarely get a really hot bath at Hot Springs, Ark., or a bath above the normal temperature of the human blood. They *can* get them as hot as can be borne, but the average temperature at which the baths are prescribed at that place is 98° F.

What, then, is the effect of this water? Let me first call your attention to the effect of a *hot* bath of the ordinary kind taken anywhere else. You may place a healthy person in a tub of ordinary hot water as hot as he can get into it, say at 107° F., and after he has been there with the temperature maintained as high as can be borne for twenty minutes, you will find that his sublingual temperature is unchanged or very slightly so. The skin may be hotter, but the heat-governing centers have seen to it that the conducted heat has been cared for; there has been no increase in general cell activity through the body and usually no increase in the pulse rate after the first shock of getting into the very hot water.

This is necessarily true. The body temperature is the same on the Fourth of July and on Christmas. The thermolytic center, if working, prevents the absorption of conducted heat; if that center is not working, a sunstroke follows exposure to heat. This rule never varies for warm blooded animals in good health.

On the other hand, you may place a person in good health in a bath of Hot

*Read in Section on Medicine, Southern Medical Association, Ninth Annual Meeting, Dallas, Texas, Nov. 8-11, 1915.

Springs water even at a temperature lower than the normal body temperature and you will see a remarkable change. The subject with a normal temperature of 98 3-5° F., lying in a cooler medium than his own blood, will experience an increase in temperature. Usually in ten minutes the thermometer under the tongue will show 100° F., in twelve to fifteen minutes 101, and I have seen the subject's temperature go much higher. Taking the water internally adds to the rapidity of the reaction. If the water is very active, it is not necessary to immerse the entire body to get the reaction. If only the feet are kept in the water, the subject's temperature will go up, though more slowly, as might be expected. Spraying or douching the body adds to the rapidity of this effect.

Where does this heat come from? Certainly not from the water, as it is colder than the subject's blood. At the same time the pulse rate is correspondingly increased thirty or forty or even fifty beats per minute, depending upon the individual's peculiar heart action.

The subject when removed from the bath sweats profusely, as he should do when sweating off a fever, and in about forty minutes his temperature is normal, the pulse running a little higher than normal for a longer period, depending on individual idiosyncrasy. The period of increased cell activity, also the duration of the sweat and the extent of elimination, may be prolonged by a few minutes in the vapor or hot room, or both.

Where does the increase in body temperature come from? Evidently some quality of the water has started a general increase in cell activity throughout the subject's body; the cells of every organ must feel the stimulus and this general increased metabolism causes a corresponding rise in the subject's temperature. Something has "started the pot to boiling," as it were, in that subject and he furnishes the heat himself for this increase in temperature.

The good effects of a tub bath at Hot Springs are due to this increased metabolism with the subsequent elimination and reconstruction and the increase in cell activity is directly measurable by the increase in body temperature.

The results of this increased metabolism are twofold, eliminative and constructive. The elimination through the skin is shown by the sweating and the elimination through the kidneys is proven by the high specific gravity of the urine, 1030 or more, seen in nearly all cases after a few baths, even when the water lost in sweating is compensated for by increased ingestion and even when the urine is kept at or above the normal quantity.

The constructive metabolism following the baths is shown most typically in chronic malaria. Here exists anemia, hemoglobinaemia and a balky condition of the hematopoietic system. After a few baths the picture changes and there can be no doubt that the change is due not so much to elimination as to hematogenesis through increased activity of the cellular elements of the blood, bone marrow, spleen, etc.

The question for years has been, "How does the water cure?" or, as we will put it, "How is this physiological effect produced?"

No drugs or chemicals known to science will, if taken into the system, cause such an increase in cell activity, and it naturally follows that the repeated chemical analyses of the waters throw no light on the subject. Thinking observers long ago came to the conclusion that such an effect must be due to a force and not to a chemical substance, and electricity or some electrical condition of the waters was often suggested as the source of its power. But this explanation failed to gain credence because no then known application of electricity would produce such an effect.

In 1907 the essayist read a paper before the Mississippi State Medical Association and another before the Louisiana State Medical Society on the physiological effects of these baths. Much of this paper is necessarily repetition from those papers, as the physiological effects of these baths have not changed at all. In those papers was advanced the following theory and priority may probably be claimed for the idea then advanced that the physiological and therapeutic effects of most thermal waters are due to their radioactivity. Since that time the theory has become generally accepted and the radioactivity of the waters of most of the popular resorts has been accurately meas-

ured. To again quote from the first paper mentioned: "Since the discovery of the X-ray, and later of radium and the radioactivity of substances brought into contact with the salts of radium, a good working theory has been brought out to account for the physiological effects of the Hot Springs baths.

"First it was found by a number of observers that incidental to the application of the X-ray, especially if in small dosage and at comparatively long distances and long duration, a distinct increase in metabolism followed by increased elimination occurred, so much so that its use was contraindicated in chronic kidney disease at certain stages. Later it appeared that radio-active substances had a similar effect. And then it was found by Professors Boltwood and Pratt, of New Haven, making tests of this water for the Interior Department, that the waters on the Hot Springs reservation are all radio-active to a marked degree and that this radio-activity is due to the presence of a radio-active gas."

The investigations of Boltwood and Pratt were made under very unpropitious circumstances on bottled water shipped from Arkansas to Connecticut. It is now conceded that such water loses 50% of its radio-activity in about three days, and as these experiments were mostly made on water a week old, they were necessarily inaccurate in a minus direction. In spite of this fact, Boltwood estimates the strongest spring here at 265.6 Mache units, which is probably the highest estimate of any American water, and only exceeded by two much more accurately examined waters in Europe, and this probably owing to improved methods of measuring raido-activity. A more recent investigation made by the Interior Department has not been made public. The accepted reason for this is that some of the springs were more radio-active than others. Instead of pointing out those of the most value, the department has attempted to pool all of the water from certain springs before delivering to the various bath houses in order that no one bath house lessee shall be able to give a better bath than another. For other reasons which will be mentioned later this desired result has not been accomplished, although good effects are obtained at all of the bath houses.

I wish to again call your attention to the fact that the physicians all over the country are under the impression that these are merely hot baths. They deter, in all honesty, patients from going to Hot Springs, declaring that hot water is hot water anywhere, and advising the patient to take hot baths at home. I wish also to emphasize the fact that while this water comes out hot, and would not remain radio-active if it came out cold and had to be heated, as it would then lose the gas in which resides the radio-activity, still that the water being hot is merely incidental, that the baths are not given very hot and that the water is just as effective at a lower temperature as at a higher, if fresh, i. e., if not too much dead water from the exposed cooling tank is used.

This increase in metabolism is not the only physiological effect of a Hot Springs bath. There also occurs a marked fall in the blood pressure. This fall is fully equal to that obtained by the high frequency D'Asronval current used with the auto-condensation pad. It will average twenty millimeters of mercury in normal individuals and a fifty millimeter fall has been noted during one twenty-minute bath in one case of very high blood pressure. This fact is not well known and before the present war began hundreds of Americans went to Nauheim for treatment for high blood pressure, leaving a more efficacious resort at home.

Judging from clinical results, there is also a rise in the opsonic index in patients suffering from most diseases. Tuberculosis and cancer are notable exceptions, as the increased cell activity in those diseases means increased destruction and waste. In cases of chronic malaria we have apparently a most marked rise in the opsonic index.

To cure a disease of bacterial origin we must give immunity or partial immunity and in no other way can health be restored. The question arises, how can the radio-active baths tend to give immunity or raise the opsonic index? *Increased cell activity* is probably the answer. The modus operandi of this brings up for our consideration the effect of forces upon all cell life, brings to mind many things anal-

ogous to the subject. The house plant, pale and white and stunted, an example of sluggish cell action, becomes, when put out in the sunlight, the acme of cell activity. What is it in sunlight that makes it grow to health and good color? Certain rays, we say, which are necessary to life—an example of the effect of a force upon cell activity. The ordinary sunburn is, as every one knows, not due to heat, but is another example of the effect of a force upon cell activity.

When a person is immersed in the radio-active water for a few minutes there is a general increase in cell activity, as shown by his rise of temperature and change in circulation. How does the radio-activity do this? I will tell you when you tell me how the sunshine makes the plant grow or burns the back of the boy in swimming.

"Cell activity" is the real definition of life—normal cell activity is health, too much of an increase means inflammation—fever—waste. Too slow a cell activity means a chronic condition, stasis. A cessation of cell activity means death.

Careful observations made at the tub-side show that the effects of the baths vary slightly at the different bath houses. The radio-activity of the water depends upon the presence of a radio-active gas. This gas is lost to some extent by exposure of the water in the cooling tanks which each bath house provides, as there must be a tank of cool water with which to temper the bath, the hot water being delivered to the bath houses at a natural temperature of from 135° F. up to 145° F.

The variation in effects at the different houses, even when supplied with water from the same reservoir, is due to the duration of previous exposure of the water in the primary reservoir and to the age of the water in the cold tank at the individual bath house. Bath houses with very large cooling tanks would be expected to have a slow bath. The larger bulk of water, cooling more slowly, would be longer exposed and become more inactive, and would probably also be delivered at the cold water faucet of the tub even warmer than from a smaller cooling tank, thus requiring more of the inactive water to cool the bath and a greater dilution of the fresh, active hot water. The results could be made more uniform if the primary reservoirs were made as small as possible to still serve their purpose, and if the cooling tanks were done away with and the water on the cold side of the tub faucet delivered through refrigerating coils.

The best and most scientific method of prescribing the baths is not to order so many minutes in the tub at a certain temperature, but that the patient be kept in the tub at a given temperature of the water until the increased metabolism has caused him to have a certain rise in body temperature as shown by a thermometer under his tongue. This measures the effects of the baths and it will therefore make no material difference whether the baths are taken at a bath house with very active water or one less active. The maximum time should, of course, be given a limit, as otherwise the circulatory disturbance caused from the heat alone might become too excessive. This method of measuring the effect of the bath with a clinical thermometer and dosing it as one would any other agent was introduced by me nearly nine years ago. For two years or more I insisted on my patients having baths dosed in that way, but had to partly abandon the method owing to the ignorance of the bath attendants and the lack of other co-operation. As the years have gone by the bath house managers and also the bath attendants have become more accustomed to thinking of the baths as radio-active and as causing a reaction in the temperature, so that recently I have been able to resume this method of dosing the baths and now secure more or less co-operation from bath attendants, although this method does give them more trouble than the old hit or miss way. I believe that this method of controlling the effect of the baths will eventually be universally adopted.

There are adjuncts to the baths at Hot Springs—the vapor bath, the hot room, the needle bath and the shower—which may be used as at other places to meet some of the indications of hydrotherapy or thermotherapy, but none of these are peculiar to the place and in the tub only is seen the true "Hot Springs effect."

So much for what we crudely know about the physiological effects of the Hot Springs baths—that they they increase metabolism, raise the body temperature,

accelerate the circulation, increase elimination, lower the blood pressure and raise the opsonic index by increasing the cell activity and also have the usual hydrotherapeutic and thermic effects of other hot water. How much it would mean to the one hundred and fifty thousand physicians of this country if they knew these facts and knew that they had been proven by the department's investigators and were vouched for by the government, which "owns and controls" the baths!

With these facts in his possession each physician could decide what patients to send to Hot Springs and which to keep at home.

But equally as valuable would be an authoritative presentation of the therapeutic effects of these baths, their effects on the sick. Thousands of sick people need Hot Springs baths and there is no one to tell them so, while on the other hand hundreds go to Hot Springs who can not be helped by the baths, and many who can be harmed by them. Consumption and cancer have been mentioned as contraindicating the baths. Any disease in the fever stage also contraindicates. Organic heart disease is supposed to be a contraindication, but in cases of certain heart lesions the baths are very beneficial. These facts should be known. Other patients who have taken a life-time to acquire gout or arterio-sclerosis or chronic joint conditions go to Hot Springs expecting to get as good results in a few weeks as a case of so-called subacute rheumatism, when they should be told before leaving home that they can get best results in months, not weeks.

My card index of diseases treated shows two hundred and ten morbid conditions that the baths have been expected to relieve. Many of these conditions are not benefited at Hot Springs, but how were the sick to know?

The United States government takes a responsibility by "owning and controlling" these baths which obligates it to know what it is offering for cash to the American public and to let the public know.

As a working rule it may be considered that any morbid condition which can be presumably helped by increased metabolism, increased elimination or lowered blood pressure will be benefited by these baths. On the other hand, any inflammatory condition in the acute stage will not be benefited and may be harmed. There is much room for judgment here—a case of so-called acute articular rheumatism should not take the baths during the fever stage, and such cases frequently arrive at Hot Springs too early and have to wait a few days before bathing, but later get remarkable results. On the other hand, a toxic neuritis may be aborted if baths are begun early, aborted by eliminating the toxins, but if inflammation of the nerve or nerve sheath is well under way the baths increase the pain and are only useful later.

The ability to eliminate drugs seems to be greatly increased and alcoholic and tobacco and drug cases are benefited and other treatment in such cases aided. Fecundity in the female is in many cases indirectly promoted and morbid pelvic conditions have a tendency to improve. Amenorrhea is frequently relieved both by hematogenesis and also by the tendency toward hemorrhagic effect often noted, although menorrhagia rarely occurs. Pregnant women risk abortion by taking baths vigorously during the first ten weeks of gestation on account of their emmenagogue effect but no danger exists during the rest of gestation, as no oxytocic effect is observed from the baths. Cases of gastric or duodenal ulcer are apt to have hemorrhages and should not take the baths, but hemorrhoids seem to bleed less. These are merely a few personal observations and are not to be taken as authoritative. Other Hot Springs physicians may not agree entirely and many other morbid conditions are benefited also.

The baths are wonderful enough and have a very wide scope of usefulness.

A few years ago a bill was introduced in the House of Representatives to appropriate $100,000.00 for the expenses of a commission which was to take two years in which to investigate the physiological and therapeutic effects of these waters. The bill did not reach a vote. This Association, through its Council, refused to endorse the bill. It is in the power of the Interior Department to prove and elaborate on the few points mentioned in this paper for a much less expenditure than $100,000.00 and thereby secure data for publication which will

enable any physician, who chooses to inform himself, what patients to send to Hot Springs and which to keep at home. It is also a duty of this Association and other medical bodies and physicians in general to demand that the United States government investigate and publish the facts as to both the physiological and therapeutic effects of any waters owned and recommended by the government. No physician should be expected to prescribe any agent without knowing both what it will do to a well man and a sick one and as nearly as possible why.

It is only fair to state that the Interior Department has spent much money in having chemical analyses of the waters made, i. e., in finding out what is in the water, but not one cent to find out what happens to a person when in the water.

Dugan-Stuart Building.

AUTHORS' ABSTRACTS

Medicine

Management of Patients with Chronic Renal Disease. By Theodore C. Janeway, Baltimore, Md. The Bulletin of the Medical and Chirurgical Faculty of Maryland, January, 1916, p. 103. Also published in American Journal of Medical Science, February, 1916, p. 157.

Discussion of safeguarding and symptomatic treatment of the usual clinical types of renal disease in the light of modern functional diagnosis. Eradication of distant foci of infection is to be urged, when any such are discoverable.

1. Patients with albumin and casts as only evidence of disease. Must distinguish convalescents from acute nephritis, who should have vigorous safeguarding treatment—bed, diet, etc.—from patients having chronic albuminuria only. Among the latter, those with postural albuminuria must be differentiated. Other cases need only avoidance of physical strain, exposure, excesses in diet, especially in condiments, salt and meat.

2. Patients having hypertension only. Require safeguarding from mental and physical strain, tobacco and excessive protein.

3. Patients having hypertension plus myocardial insufficiency. Treatment wholly cardiac. Karell diet most valuable—restricted NaCl and fluid; digitalis.

4. Patients with general oedema, but without myocardial insufficiency. NaCl retention is the prominent disturbance in these cases, and NaCl—poor diet, plus accessory dehyrating measures should be the treatment.

5. Patients with advanced renal insufficiency—uraemic symptoms superimposed upon one of foregoing types. N. retention is prominent. Low protein diet with ample carbohydrates. Bleeding for convulsions. Sweating. Most important is the treatment of associated myocardial insufficiency or urinary obstruction. Decapsulation or splitting capsule is to be considered in cases doing badly, especially in oedematous types.

Accurate functional diagnosis is now possible, and the treatment should go only so far as is necessary in safeguarding the damaged function without unnecessary burdensome restrictions.

A Comparative Study of the Diagnostic Tests for Syphilis. By William Krauss, Memphis, Tenn. The Journal of the Tennessee State Medical Association, January, 1916, p. 383.

This is a critical study of the literature and an attempt to collect all that is valuable for the purpose of furnishing data from which an opinion could be formed as to what might be expected of a given diagnostic measure in a given case.

The study is grouped under the following heads:

1. What can be expected from examination of the pressure juice from a primary lesion. No other method than the use of a modern dark field system is worthy of attention. This is positively diagnostic and is the one diagnostic measure recommended for use by the doctor in his practice. Success nearly always rewards the patient searcher.

2. Diagnostic chances from examination of the blood. Tests other than the Wassermann are referred to and their relative value considered. The various precipitation tests are regarded as unworthy of attention. Those who care for the literature which was the basis of this opinion will find it in the appended index.

The serum Wassermann test is next considered, with tables and percentage results by numerous authors of very large experience, with special reference to stage of the disease, amount of treatment if that is given in the original tables, and some comparative tables of advocates of different systems where the system or modification used is given. No hard and fast deductions can be drawn because of variable factors.

3. The spinal fluid, considered under the following heads: The spinal fluid in general syphilis, congenital and acquired, in evident disease of the cord, meninges and central nervous system.

The four classical tests of Nonne, the colloid gold test of Lange in syphilis of the nervous system, and their relative value in the different manifestations of syphilitic disease of the nervous system. Details of the tests for globulin are given. Comparative tables of these reactions by several authors.

4. The luetin test: Its use, the kind of reaction to be expected, and the range of usefulness as contrasted with other methods of diagnosis, with tables by several authors.

5. Finding spirochetae in later manifestations of syphilis, by the Levaditi method, animal inoculation and anaerobic culture of the spirochetae. This subject can not be tabulated.

TROPICAL DISEASES AND PUBLIC HEALTH

INTENSIVE COMMUNITY HEALTH WORK—ITS VALUE IN THE DEVELOPMENT OF PUBLIC HEALTH AGENCIES.*

BY JOHN A. FERRELL, M.D.,
Assistant Director General, International Health Commission, New York, N. Y.

Intensive community health work differs from ordinary health work, in that a concrete health problem is taken and adhered to until measurable progress has been made. It is limited to a relatively small circumscribed area or areas instead of being diffused throughout a large area such as a state or a county. A detailed record or a survey is made of the area selected, including every house, school, church, road and stream and usually, this information is shown on a map. Every home is visited and inspected and every person is examined as far as practicable with reference to the particular health problem under consideration. A record of the disease in the past and its probable consequences is made so that when the work begins we have a definitely marked starting point.

The size of the community, the number of its population, and the personnel of the working force will doubtless be found with experience to vary somewhat in accordance with the particular disease being combatted. The work I have studied and observed is that being conducted at present by six of the State Boards of Health in the South and directed to the prevention and cure of hookworm disease. Up to June 30th this work had been completed by these States in twenty-eight communities. With two or three exceptions, all of the communities may be regarded as representative of the strictly rural farming section. The smallest community contained one square mile, the largest one sixty-three square miles, with an average of twenty-six square miles. The number of families ranged from sixty-eight to two hundred and eighty-five, with an average of 161. The number of inhabitants ranged from 308 to 1473, with an average of 825. Considered collectively, 50% of the population was white; 42% of the families were tenants; 53% of the families had privies when the work began, practically none of which were sanitary, and 47% had no kind of a privy. When the work closed 88% of the families had improved privies that will greatly lessen the spread of hookworm disease and other diseases that may be spread through the careless disposal of human excrement. Seventeen per cent of the population had hookworm infection, and of these 92% were treated. The average time spent in each community was ninety days; however, many of the first communities with an inexperienced working force required much longer. The directors, experienced in the work now, believe that the percentage of results accomplished is going to show an increase, and, at the same time, the period required to complete the communities will be lessened. This, of course, is in the direction of increased practical working efficiency. These facts are mentioned here to give some idea of what constitutes a community and of the work undertaken and the method employed.

The working force or unit consists of one medical field director and three lay assistants and costs about $5,000 annually. The funds are raised on different plans in the different states, but generally the community, the county, the State Board of Health and the International Health Commission, contributing through the State Board of Health, jointly pay the cost. In states where funds from all of these sources are not available, those agencies that do have funds available pay for the work.

The plan at present employed provides for a working unit of a field director and three health inspectors as assistants, who conduct activities in three communities

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simultaneously. Each community for the ninety-day period has located in it more or less constantly one of the health inspectors. The three communities combined make up a series. Four series or twelve communities may be completed by the working unit during a year. If the successive series are located in a single county, little time is lost in making transfers and the results are proportionately larger. In small counties the twelve communities will come near covering the entire county.

With the growth of this community work, the results have grown larger and become more definite. The field directors who have been in health work for years feel that the community work is the best real contribution they have made in the field of preventive medicine. The work is carried on in the rural sections on a scale fully within the comprehension of the average man. He is familiar with conditions which preceded the work, and he observes the improvements following it. He weighs the facts and sees in the undertaking a good business investment. Having controlled one disease, he is ready to lend himself to the control of other diseases and to help provide the necessary funds. He is ready to vote for legislators who will in turn vote funds for strengthening the directing head of the work, the State Board of Health.

Thus it has been demonstrated that intensive community health work is practicable, that it brings definite and convincing results, and that its cost is not beyond the means of the people. It thus affords an opportunity to advance public health work on the basis of concrete demonstrations just as farming has been revolutionized by the concrete demonstration. You will recall that before the days of the farm demonstration work the State Departments of Agriculture carried on their work in a diffuse way from the office desk and the people were not effectively reached; little progress was made, and the agricultural departments had scant funds. With the change in policy leading to the concrete demonstration and to activities carried on very largely where the people live, we have seen wonderful progress and the departments of agriculture now find themselves with immense resources sufficient to carry on the needed state agricultural work unhampered.

After the community health work has been conducted in three or more communities in a county there will be developed incidentally, with proper guidance, a sentiment favoring a county department of health with a full-time county health officer. It is the belief of some state health officers that the people having seen the necessity for a health inspector, working under a medical officer, devoting his entire time to a single community and to a single task in order to obtain definite results, will not be content to employ a health officer and expect him unaided to do all the health work needed in the county. This theory is borne out by the developments in road building during recent years. We can all remember when the expenditures for country roads were negligible, and as a result road traffic was more than sluggish. Finally, a few miles of high-class road was constructed at selected points in suitable counties where the people could see and use it and compare the size of load a horse could draw on it with the load he could draw on the road they were accustomed to; where they could observe the speed that could be made with buggy or wagon on the good road as compared with the old roads. The result has been that counties all over the country are now spending from $100,000 to $500,000 to build a system of good roads and are providing for their maintenance. With the establishment of a strong county department of health having a sufficient force to take up one definite health task after another and control each and be able to hold and maintain the standard reached, the state system of health will be reflexly strengthened and the time necessary for the development of a complete state health system will be greatly shortened. Many departments of health have, by persistent effort, been able to grow after their establishment until there is a health officer, heads for two to six divisions of work, and a small clerical staff. The obtaining of funds for growth beyond this point has become progressively more difficult. While I am confident that the community work has a definite and fundamental value in the development of a complete state system of health at any

stage in the growth, it is of especial importance, I believe, to a state health department that has a nucleus but is finding difficulty in securing funds for growth.

It affords an opportunity to go out and definitely prove to the satisfaction of the average man the claims for preventive medicine that have been made by the health officer and his assistants in pamphlets, newspaper articles, addresses, etc. It establishes interest and confidence in the lay mind, which results in the local appropriation of funds for extending intensive community health work. The local enthusiasm thus created makes a convert of the local legislator. He goes to the general assembly ready to champion the cause of public health, and he speaks on the basis of first-hand information. Other legislators wish to become factors in carrying the work he describes to their constituents. The state health officer is, of course, on hand to advise them how it may be done. The appropriations needed are granted and soon we may expect to see the community work spreading and complete county departments of health in the process of development; and the state department of health reflexly broadening until its juncture with the county forces is effected. The activities at the capitol of the state and those in the community, fathered at the capitol, react on, aid, and stimulate each other. Thus an adequate health agency is developed to carry on public health work in the state. The necessary funds are provided partly by the state and partly within the county. The result is that a tremendous volume of work may be done without making the expense unbearable at any point.

RURAL SANITATION IN THE SOUTH. TWO VITAL FORCES: THE WHOLE-TIME COUNTY HEALTH OFFICER AND SPECIALIZED UNITS OF HEALTH WORK BY STATE BOARDS OF HEALTH.*

BY J. HOWELL WAY, M.D.
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Effective sanitation demands the co-operation of the people. The single agency through which people co-operate as a body is their government. Sanitation being necessarily a governmental function, may properly be classified according to the different types of government exercising this function into federal, state, municipal and county sanitation. As the county government is the rural government, county and rural sanitation become synonymous. In the United States 53% of the population live under the approximately 3000 county or rural governments into which the forty-eight states composing our nation are subdivided. Through the development of a county system of sanitation, these 3000 county governments afford opportunities to bring practical sanitary betterment within the range of actual working distance of our great rural population. These opportunities are greatest in the states of the South, where 80% of the people reside under the 1310 county governments, and where the county is more the unit of local government than in New England, the states of which still make, to a large degree, the town the governmental unit, or in the states of the West and Middle West, where a commingling of both thoughts dominate the ideas and purposes of rural governments.

NATURE OF THE RURAL HEALTH PROBLEM.

This may readily enough be determined by any one who, with his mind fixed upon an average farm home, will ask himself the question: What can the governments, federal, state and county, do to promote the health of that rural family, and to protect it from the inroads of disease in general, or from the incidence of some particular disease to which it may be liable? The answer to that question is the answer to what is the real object of rural sanitation, and the answer is this: When all the combined governmental health agencies have made that average farmer understand (this is very often much more than merely writing to him or telling him) how he may best promote health conditions and protect himself and family from disease, government has gone as far as it is possible to go, under ordinary circumstances, in the protection of that family. This is not strange, for when we come to think of it, all governments can do comparatively little for the average

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man as compared with what he may do for himself. Rural sanitation is, then, and must necessarily continue to be, in its larger degree, educational work. Sanitary legislation, so very necessary in urban sanitary work, is of much less importance than in the cities, for in the country each family, from the viewpoint of the operation of sanitary laws, is, to a very considerable extent, a law unto itself.

TWO AVENUES OF APPROACHING RURAL SANITATION.

In influencing a county government to adopt measures which sanitary advance has shown to be reasonable ones for the protection of the health of its citizens, we may submit two relatively simple propositions: First, we may propose to the county that it set aside $3000 or $4000 per year, to be expended through its own county board of health, its own chosen officials, and in their own way, on the conservation of the health of the county people. That is to say, we may ask a county to develop and execute its own plan of health work; second, we may ask a county to consider its health problem in its entirety, with a view to dividing the whole county health problem into a number of independent health problems, or units of health work, and that it employ the State Board of Health, at a sum agreed upon between the county and the State, to work out one, two or more, or all of the separate county health problems. The first proposition enunciated above is what is usually spoken of as the Whole-Time County Health Officer Method; the second proposition may be spoken of as the Unit System of County Health Work. Both these separate and distinct plans of county health work are in operation in North Carolina.

THE WHOLE-TIME HEALTH OFFICER PROPOSITION

North Carolina at present has ten counties with whole-time health officers. In two of these counties the urban populations are so much in excess of the rural that we may exclude them from the present consideration. In eight counties in North Carolina where the health problem is purely rural the whole-time health officers have been at work for from eight months to four years. The whole-time county health officers are elected by the county boards of health, over which bodies the State Board of Health has no statutory control. The county board of health may, therefore, elect any one they please as whole-time county health officer. As a rule in North Carolina, the county boards of health have shown a wise discrimination in the election of whole-time county health officers, and only in exceptional instances has the influence of politics swayed more than a due regard for the scientific and other qualifications of those elected.

The office being a new creation, without definite specifications as to either responsibilities or duties of incumbents, coupled with an absence of precedents, and in particular a statutory-provided central control which could bring to each man the benefit of the other's work, has resulted in placing grave and unexpected burdens upon our whole-time county health officers. That their work has been done carefully, honestly, and with as great a degree of efficiency as circumstances have made possible, I do not for one single moment question, but it is my deliberate judgment that in none of the eight counties has as yet been developed an ideal plan of county health work, nor has a model system been elaborated. This is not by any means a reflection on either the whole-time county health work or upon the capable and zealous gentlemen serving in these positions. It is simply a statement of opinion as to inevitable results in the early days of what is as yet pioneer work along public health lines. The eight rural health workers are each following in a way their own ideas, reinforced, perhaps, here and there by an occasional suggestion or idea developed from reading or from some other man's field of work as to plans and practice in county health work, and up to the present their ideas are so divergent it is really a difficult matter to compare the work of one county with that of another. The answers to a *questionairre* recently mailed by the State Board of Health to the whole-time county health officers indicate that the average health officer is on record as accomplishing the following work during the year:

He is making 78 public health addresses to an average audience of 85 people, using lantern slides in about one-eighth of the addresses; he is publishing in the county papers 12 columns of newspaper material

dealing with sanitary matters; he is distributing 1,500 pamphlets dealing with questions of sanitary import and 4,000 leaflets on sanitation; he is inspecting 45 schools, finding therein 500 defective children, and having 90 of the defectives treated; he is vaccinating 3,000 people against typhoid fever, and about 500 against smallpox. In only one of the counties reporting does the quarantine of communicable diseases appear to be in any way effective. He is building 50 sanitary privies per year; is sending 102 specimens to the State laboratory for examination and treating 72 cases of hookworm disease. This, in brief, is an outline of the development of the whole-time county health officer plan in North Carolina as officially recorded, but aside from these details there must be an unmeasurable increment of impetus given to the study and practice of sanitation and disease prevention that entitles our county health workers to a large additional entry on the credit side of the ledger.

Our whole-time county health officers have undeniably wrought well, and a tremendous amount of helpful work has been performed as a result of these eight men having devoted their time, study and effort to the health work of these counties, but the volume of accomplishment is unquestionably not nearly so great as could have been done under a well devised and properly formulated system of county health work.

Undeniably the weakness of the system, as at present employed, is the absence of clear-cut and well defined plans of effort. There is no definite standard of efficiency or of accomplishment by which the work of the men can be compared and their efficiency or deficiency recognized and rewarded or corrected. A State Health Officers' Association has been organized, at the meetings of which reports of work and discussions of plans are had, which have alike been constructively helpful and as well emphasized the lack of systematized endeavor. Such a state of things can but naturally exist in relation to a subject that is being developed, and an intelligent recognition of the facts does not tend to produce a sentiment adverse to the continuance of the whole-time county health officer's work, but the lesson I believe I am safe in saying for North Carolina is that State Boards of Health should proceed with deliberation in the matter of urging counties to employ whole-time health officers until an adequate system shall have been worked out and the whole correlated into one compact central system, to which regular reports are made, and from which helpful constructive direction may be had. We hope in our own State to see the counties continue the good work that is being done by our whole-time county health officers, and in the meanwhile, with their friendly assistance and co-operation, it is hoped to work out and construct within the next two years a model system of county health work with definite purpose and plans. One of our most successful whole-time county health officers was, during the present year, called to the offices of our State Board of Health and a special Bureau of Rural Sanitation created and he placed in charge for the purpose of more rapidly furthering this work. When such plans have been definitely formulated, the State Board of Health will be in a position to approach a county with a proposition to adopt a plan of work—the real object we are after—rather than have presented to it the proposition to create an office, the means to what we hope to get. So much for our first plan of county health work.

THE UNIT SYSTEM PROPOSITION.

Last summer we began this second method of county health work. Our State Board of Health proposed a unit of typhoid immunization to several counties. The proposition made to them, briefly, was this: For an appropriation of $400 placed to the credit of the State Board of Health, a dispensary campaign for typhoid immunization in the county was arranged for, dispensaries were opened at convenient points throughout the county and every effort made to educate and vaccinate against typhoid fever as many people as possible during a six weeks' campaign. In twelve counties accepting this proposition a total of a little more than 52,000 persons were immunized, or an average to the county of 4,300 people. In this work the State Board had engaged ten men, five physicians and five junior medical students assisting.

Another unit for which several counties have recently made appropriations,

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and which is now in process of execution, is our school unit of county health work. A limited number of counties have had submitted to them by the State Board of Health the following plan of work in county schools for a county appropriation of $10.00 per school in the county: The State Board of Health agrees to arrange, through the county school authorities and with the school teachers, a program of consecutive health days for each school as follows: Two weeks before Health Day the principal of the school receives from the State Board of Health a batch of hand bills announcing the date and the program for Health Day in that school. These hand bills carry an invitation to the patrons of the school to attend the exercises, and are distributed through the children to the school community. The representative of the State Board of Health arrives at the school at 10 a. m. on Health Day. He makes a fifteen-minute talk to the children and visitors on the importance of a knowledge of health and its laws. A medical inspection of the children is then made, giving each defective child a card and advising that he see the inspector at the close of the inspection after the conclusion of the exercises. A report is also sent the State Board of Health, which, through a system of follow-up letters, continues in touch with the child until its parents have it treated. The inspector also questions the children after the method of the olden time spelling match on a health catechism, which has been previously sent out in sufficient number to supply all pupils fully one month before the inspection visit. Evening exercises are also held by the inspector, consisting of three to four short illustrated lectures by the inspector on important sanitary topics, interspersed with the reading of select compositions by the school children on health subjects. Concluding, the inspector awards prizes, the first for the best knowledge of the health catechism, and the second for the best composition. Each school is graded, score card method, on the excellence of its record on Health Day. When the inspector has completed the county school unit, a county prize is awarded to that school giving the best co-operation in the work; a county prize is also awarded for the best composition, and another prize for the best knowledge of the catechism. Ordinarily, an inspector can handle the usual rural school in a day, though some of the larger village or town schools require two or more days.

In our first county to adopt this unit of State Board of Health work there are 57 schools, which will require practically three months. The inspector will, like the school teachers, have hard work five days in the week with Saturday and Sunday for rest and recuperation. This unit of school work, as we are now demonstrating it in North Carolina, couples medical inspection of rural schools with the sanitary instruction of the entire community, young and old alike—the young through the health catechism, compositions and lectures, and the old through the lectures, but also in very large degree through the help the children of the average rural school will demand at home of the elder members of the families in learning the health catechism and in preparing the compositions.

Some of the advantages of the unit system of county health work are as follows: It affords a new source of revenue to the State Board of Health. The board secures appropriations for its work from the legislature ordinarily only, but by this method the counties themselves contribute monies to support the work. Again the State Board unit system absolutely eliminates politics from the county health work, the State Board of Health using its own employees, under its own directions, in accordance with its own plans, to execute the units in a given county. These are pronounced advantages from the board's viewpoint. From the county side of the proposition, it is manifest that a system that insures a possibly better method of doing its health work is an advantage to it, besides the most important matter of the adaptability of this plan to counties. Under the unit system we hope to work out in time a county unit of infant hygiene work, a unit of anti-malarial work, and when our pellagrologists have developed their work a little more, possibly a unit of anti-pellagrous work. In fact, under this system, practically any health problem in a given county may be made the subject of efforts for betterment. When a county has tried one unit of work, another may be taken up if the county

has an income sufficient to justify the expense. If a county has sufficient income, all of the various units may be worked out advantageously. Again, the introduction of a single unit may afford the beginning of public health work in a given county.

THE RELATION OF THE TWO PLANS OF COUNTY HEALTH WORK.

Until a perfected or model plan of whole-time officer county health work has been evolved, and has sufficient endorsement by the National Public Health Service and State Boards of Health to compel its recognition as a standard plan of sanitation for rural communities or counties, the unit system of county health work will give more definite results, and for less money, in the sanitation of rural communities than the whole-time county health officer as working at the present time. You may ask, would I advise the discontinuing of the whole-time county health officers we now have in North Carolina? No, far from it. A more earnest, zealous set of men are not anywhere working out difficult problems for racial betterment than are they. But as yet there are so many new theories to be tested out in medical and sanitary science, too, that thoughtful men will, with all the knowledge we now have on these matters, hesitate in extending the line of what is in part experimental work until more definite methods are arranged for the carrying on of rural sanitation. In the meantime, let populous and prosperous counties that have already established the office of whole-time county health officer continue his services, but at the same time let the State Boards of Health give also fair trial to the system of specialized units of public health work to the end that practical comparison of methods, results and expense be arrived at. This, of course, is necessarily only a provisional plan, to be followed for the next few years. Eventually, when methods of rural sanitation become standardized, our counties grow in population and wealth, the unit system operated by State Boards of Health will logically, naturally and appropriately give place to the whole-time county health officer, but for the next five to fifteen years the unit system, possibly, is destined to exercise a more practically helpful influence on the progress of rural sanitation than can be evolved by an adherence solely to the whole-time county health officer plan which so many poorer counties of minor wealth and population do not feel they may institute as yet.

SANITATING A RURAL HOME.*

By R. N. WHITFIELD, M.D.
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Florence, Miss.

Some months ago, while looking over a local paper in Hattiesburg, Miss., my eye was attracted to a paragraph in the editorial column which struck my fancy, and I tore it out and laid it away, thinking that some day I might use it to advantage in impressing a useful lesson. This is how it read:

"Oh! Think of the Home Over There" is the sweet refrain of a popular hymn. We do not want to throw any cold water on the honest efforts of this pious poet, but we do wish he had directed his energies to the improvement of the home down here. When a man or woman thinks of "the Home Over There" so much that the home below the clouds gets but little attention, we think that kind of piety is not practical. Think of the home you occupy and try to make it better, happier, and purer. The home over there is in better hands, and won't need your exclusive attention until you get there.

The editor of this paper has been in close touch with my honest efforts to get some improvement in the homes "below the clouds" in the rural districts of his own county, and perhaps it was this influence which prompted him to bring to time that class of men and women who gaze beyond the stars and let their earthly homes go to filth and ruin.

There is no grander thing on earth than a peaceful, happy, healthy home. It is the foundation of society and the cornerstone of state and nation. It does not lie within our sphere as sanitarians, however, to improve the social and religious atmosphere of the home, but rather to bend our energies toward the betterment of those conditions which by their existence invite suffering, misery and death. So doing,

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and so succeeding, we lay the foundation for a stronger manhood and womanhood, a more hardy race, a greater state, and a mightier nation.

The great need of the South today is the improvement of the rural home. First, because it *needs* more improvement as a rule than any other home; second, because in the South the rural population is greatly in excess of that of the cities and towns; and third, almost all the public health services have been performed in the cities and towns to the exclusion of the rural districts. To this, however, there is one notable exception—one great agency for good—the Rockefeller Commission has labored unceasingly for the past five or six years in eleven Southern states. The men in charge of this big undertaking have visited and lectured in almost every nook and corner of these eleven states. They have examined over a million people for hookworm disease; have treated up into the hundreds of thousands, while at the same time they have spread the gospel of sanitation in general throughout the whole land. This was the greatest gift the South has ever had, and we are glad to know that the public health officials in every state not only gave their endorsement, but rendered their hearty support to the work.

The second greatest need in the South is the divorcement of public health from peanut politics. The most pitiable spectacle we have in our body politic today is the struggle of pie hunters and coat-tail hangers for those positions that deal with the preservation of the health and lives of our people. The peanut political doctor should be tabooed from the councils of men who are honestly striving for the betterment of the health and conditions of our people.

In this connection I wish to say that no physician will be a success as a health officer so long as he is allowed to practice his profession. A full-time health officer should be placed in charge of every county in the South, and he should be a competent, capable man.

Another important need that I could mention in this connection is the setting of better examples in sanitation by our town and country doctors at their own homes. The laity naturally looks up to the physician for guidance and example, and yet we find the average country doctor with unsanitary closet, and possibly not a screen about the house.

"Back to the Farm" is a slogan we have often heard and read about in recent years, and I have seen a great deal of it taking place. This movement is doing much to unify the sentiments and ideals of the city and the country. It is helping to disseminate among the rural men and women the ideals of better living which have been gleaned by the city man moving to the country, because in the city he has been in closer touch with advancing civilization. I long to see this slogan triumph. There is too much of God's green earth unoccupied, and too many human beings suffering and starving within the crowded limits of our cities and towns. I do not want to live where the free air and sunlight is shut out from my home by the imposing edifices of my neighbors. I do not want to live in a tenement or a flat where there is scarcely a foot of ground whereon my children can play; where my neighbor, though only ten feet away, is a total stranger to me, and I to him. I do not want to live in a turmoil of strife and noise. Give me a country home—a rural home—not a country house as it is today, but a *real* home, such as it should be and can be made.

I would like to tell you my ideal, in a brief way, of a sanitary rural home, toward which I am myself building for the safety and comfort of my family. If it is possible, the building should be constructed upon the crest of a gentle eminence, with natural drainage in all directions. If no elevation is accessible, tile drainage should be resorted to to remove the water from the soil beneath the house and premises as well as from the soil beneath the barnyard. A layer of concrete ten or twelve inches thick and covered with tarred felt and hot pitch should take the place of the top soil beneath the house. This will prevent soil air and dampness from making their way up through the floors into the rooms. The floors should be doubled and the top floor painted or varnished. The weatherboarding should be nailed to a layer of stormsheeting, and the inside ceiling should be covered with beaver board. I prefer the modern bungalow, because its windows are high and large, allowing plenty of light and ventila-

tion, and because its roof extends far enough over the walls to keep them comparatively dry all the time. The windows should be covered with sixteen mesh gauze wire hung on frames that swing from the facings at the top. There should be a vestibule with two screened doors at every entrance to the house. All the galleries should be nicely screened, and it would not be complete without a sleeping porch to use during the heated season, and in fact should be used the whole year round. During very warm days a vast amount of heat accumulates beneath the roof of any house, which even forces its way down into the rooms beneath. To carry this out and thus render all the house more pleasant, large shafts with raised covers should extend a foot or two above the ridge of the roof, and they should be provided with arrangements to close their lower ends when the warm season has passed and the winter season arrives. For heating purposes, I believe there is a way to greatly improve on the old-fashioned fireplace. There is a stove made which will both heat and ventilate a house if it is properly adjusted. This stove is fitted with a jacket. Fresh air passes up between this jacket and the stove from a flue that comes from the outside. In this way warm fresh air is introduced into the room. Another flue reaches nearly to the floor and goes out through the roof or into a chimney. The stove pipe runs through the upper part of this flue, warming it, thus creating a strong upward draught and drawing out all the foul air as it accumulates in the room. The old-fashioned way of baking on one side before a fireplace and being chilled on the other side by the strong draught making for the fire does not appeal to me as being a very healthy procedure. We have the choice of a cold draught or a hot, stuffy room, and I do not know which of the two evils is the most acceptable.

There should be a deep well affording pure, wholesome water. This should be lifted to a tank above the house by a gasoline engine, thus rendering it possible to have a bath tub and a water closet, and these should empty into a septic tank. The barnyard and stalls should be cleaned every day, and the refuse treated with a solution of borax to destroy all fly eggs and larvæ. No mosquito nor fly breeding places should be allowed to exist in the vicinity, and hog pens should be conspicuous by their absence.

A man established in a home like this, with a good cook, a telephone, a rural mail box and a Ford automobile ought not to feel like "this world is but an empty dream."

I have presented only a dream. There is scarcely a home in the rural area of the South that will measure up in all details with the model I have just briefly described. Rather let us swing back to the opposite extreme and view the picture of the typical *desolate* rural homes as we find them in our rounds in the piny woods of Mississippi, in the mountains of Kentucky, in the hills of Tennessee, and all over our fair Southland.

The first sad feature that this home usually presents is that here is a man who *has* no home—no place to call his own. Whether by misfortune, by lack of resistance to opposition, by accident or by choice, he has been buffeted from pillow to post—here one year, there another, raising a numerous progeny to follow in his footsteps, with no love of home and country, no education, no desire for noble accomplishments. Cleanliness here is the unknown equation. Slovenliness is the grand ruling passion, and work is to be done only from dire necessity. The front yard gate sags down on one lame hinge; the fences are used for kindling and stove wood; the yards are a riot of weeds and trash. Goats and hogs sleep under the house; the poultry consists of a dominecker rooster, a frizzling hen and one small, starving chicken. Perchance he has a swine, whose long, slim snout and thin, sharp back tell a tale of neglect and want. You will be mistaken if you imagine that this is an end of the livestock show, for the picture will not be complete without the view of three or four lean hounds seen from their vantage points just outside the kitchen door. It is useless to describe the family group that forms the center of this picture of desolation. Suffice it to say that here is a shiftless, ignorant father, a care-worn, burden-bearing woman, a motley crew of boys and girls more like varmints than human beings. I have not drawn upon my imagination in giving you this view, for there are thousands of families in the South who

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are living under no better surroundings. People of this class do not think. They can not or do not use their minds; they are guided by prejudice. This is one reason why I say a competent man should hold the position of health officer—a man who not only knows his job, but knows mankind as well.

Suppose now we turn to the average rural man—the man who owns 60 acres and a home. He owns a fairly comfortable house, but his sanitation is wofully short. If he has progressed a step in this line he has only put up a few screens. The country man is fast learning to hate the fly. He is not yet convinced that the mosquito carries malaria. If there is a closet on the premises it is unsanitary, is cleaned by chickens, hogs and dogs, and is a nesting place for flies. All the water for cooking, drinking, washing and scouring is drawn by hand—usually the woman's hand—from a well that is from forty to eighty feet deep. I have often heard men say, "I wish I had some good old country grub." This ambition is a laudable one, but I would like to add one amendment, and that is "if this grub is properly prepared." Have you ever taken a breakfast in a country home where the biscuits were as big as terrapins and raw inside? Where the butter was soft and white and spongy, with a woman's hair deftly holding it together? Where the molasses pitcher stood half-cocked and contained from one to ten flies and a dozen ants? Where the coffee seemed to be half full of sawdust and the eggs were fried into a flinder? Have you ever taken a dinner at a country home where the bread was deep and soggy? Where the collard greens were dry and stood on end "like the quills of the fretful porcupine?" Where the meat was fat and rancid, and the buttermilk was sour and flaky? Then I would say, good Lord, give us women who know how to cook; for bad cooking is the root of much evil and disease. I have often heard that it is a just ground for divorce.

One stressing need of the country home is to lighten the burdens of the mother. She gives birth to a child every couple of years and nurses one over half of the time; she cooks and sews; she sweeps and scours; she draws all the water from an eighty-foot well; she breaks her back over a washboard; she nurses her sick; she helps in the field. No wonder she says: "I ain't much; I'm feelin' po'ly today." I heard of one woman who was asked how she would like to die and be buried. She sighed and said: "I think I would like it; I would get a good long rest."

How would I sanitate a rural home? That is a bigger question than it looks to be on the surface. There are so many things that I would want done in that home that it would take a long time to tell about it. I have already described what a model rural sanitary home should be. Speaking broadly, there are three important and essential steps to take, and if we could get these three things done in every home, we would eliminate one-half of the sickness in the South. The cost is small—from ten to twenty dollars to the home—the price of two average sized shoats, fifteen bushels of corn, a good sized yearling, or the seed from one bale of cotton. I refer to *clean drinking water, thorough house screening,* and *two sanitary closets.* Poverty is not the drawback that hinders us from carrying these reforms into effect. Let a man be ever so poor, if he is a convert to the doctrine of public health he will find a way. In fact, if he has brains enough to see ahead, he will do these things as a preventative of debt, as a saving in his household expenses. Every home, from the highest to the lowest, already has a well or a spring, or some other source of water. A little effort is all the expense that is needed to put this probable avenue of danger into a state of safety. If a man is too scarce of money, he can dig a hole in the ground, put a lid over it, and he will have a sanitary privy. Then he will only have to save up a few dimes and purchase gauze wire enough to cover his windows and doors.

What type of closet should be used? This depends on the ability of the owner. A septic tank comes first. If he is not able to put this in, then a fly-proof privy, either a pit privy or a pail closet. The pit privy needs very little attention for at least two years after it is built. A new pit is then dug and the old one filled. This type of closet is suited for stiff, dry ground, and is not safe in a limestone or gravel soil. It is still safer when it can be on a slant from the well about 200 feet away. We have gotten about five hundred

pit privies built in the rural districts of Forrest county this year, and possibly an equal number in Prentiss county in the same state. This has been a great step forward. More than half of these homes had no closets at all. Many men who built two sanitary closets had raised large families and never had a closet on the premises before. The pail closet needs frequent attention. The average rural inhabitant will neglect it, and when he does neglect this kind of closet for a week or two it will fall into disrepute; however, as I have said, it is necessary to use this type where the pit closet is not practical. Besides these major improvements in the rural home, I would want to see a clean, dry barnyard and stables. I would want to do away with the filthy pig pen. I would want to see the cows milked in a clean and sanitary manner, and the milk properly handled, and many other matters of minor importance done which would help to make a sanitary home.

Perhaps in this connection it will not be amiss to give a brief description of the various types of closets that may be used in sanitating a rural home. This has been a vexing question before the men who are at present engaged in closet construction in the South. We have had quite a deal of discussion over the proposition of selecting a uniform type that may be recommended to all classes and in all sections of the country. There are three essential points to take into consideration—the mental status of the owner of the property; his financial ability, and the character of the soil.

There are hundreds and thousands of men who are able financially to install a small system of water works and build a septic tank, but many of them are not converted to the necessity, and possibly have raised large families without ever having a closet of any kind on their premises. We might get such a man to install a much cheaper system, such as a pail or pit closet, and in time he will see his way clear to building something better. We can not go all the way in sanitating a country home by taking just one leap at the proposition. If we can get a man to dig a hole in the ground and cover it with a lid, we are leading him one step nearer to the sanitary ideal than he has ever been before. If we can get him to screen his kitchen or his dining room, we are still inculcating a progressive spirit into his life, which may eventually lead to the eradication of malaria from his home.

The septic tank for a small family consists of a vault built of cement and sunk in the ground. The walls are about five inches thick, and the vault is subdivided into about three compartments by partitions that reach alternately near the bottom and near the top of the tank. The inside measurements are about 4x4 and 8x8 feet—about the size of a cord of wood.

One or more manholes are constructed in the top; the sewage comes in at one end after passing through a trap and goes out at the other into a series of tile drains laid a few inches beneath the soil. In the Kentucky style of sanitary closet the privy house is built above the first segment of the tank and requires the addition of two or three buckets of water per day.

The pail closet is adapted to any rural home. The material costs from three to five dollars, about one-eighth as much as the septic tank or the Kentucky type of closet. However, the amount of attention needed for this closet renders it an uncertain quantity when we come to considering the proposition of sanitating a whole rural community. The pails should be emptied every week or two, and the refuse properly disposed of. Even when these precautions are carried out, the refuse is usually buried a few feet in the rear and makes of the pail closet a pit closet after all, only in a round-about way. This type of closet is built as any other closet except that the floor extends to the rear, the seat is wider and a trap door opens behind. There should also be lids on the seat and a flue extending from the seat on up through the roof. Pails or tubs are placed in the seat box and are emptied at regular intervals.

The pit closet, which may be used in any compact, dry soil, is a closet about 4x5 feet in size, with a seat twenty-one or twenty-two inches wide, built solid over a pit two feet and a half wide, and a little shorter than the closet. Its depth will range from three to six feet. Hinged lids are placed over the holes in the seat and a flue extends from the seat on up through the roof. In other words, all the closet beneath the seat is fly-proof. The dirt is banked up a few inches all

around and suitable drainage provided to keep water from running into the pit. A few shovelsful of old compost should be thrown into the pit to introduce nitrifying bacteria. In two counties in Mississippi we have gotten practically a thousand of these closets constructed, and mostly at homes that have never had a closet before. If we had started in with the septic tank or any other costly device, we could not have gotten a hundred built in the same space of time.

The L. R. S. privy is an excellent contrivance, and is strictly sanitary if properly looked after. The main features of this closet are a barrel, preferably made of metal, a T-shaped pipe, and an iron pot on the outside which receives the overflow through the pipe from the barrel. The barrel is placed under the seat and is filled with water to the level of the discharge pipe. A shovelful or two of compost should be introduced into the barrel to start the nitrifying process and the pot, when full, can be easily attended to, as it contains only fluid, which can be sterilized by boiling or by treating with strong antiseptics. The barrel itself will not need any attention for possibly two or three years, when it can be cleaned out and more water introduced. This type of closet can be used in the limits of a city as well as in the country.

The sanitary box is the cheapest and simplest of all devices for the disposal of human excrement. It consists of a strong box with a hole and a lid placed over a hole about eighteen inches square and three or four feet in the ground. We have gotten quite a few of these put in where we could get nothing else, but the cost of the pit privy is so small almost any man, no matter how poor, can build one for the use of his family.

We have no figures to show how many hundreds of thousads of cases of malaria we have in the South each year, nor can we give the exact number of cases of typhoid fever, dysentery and other intestinal diseases. Suffice it to say that in Mississippi we had last year 625 deaths from typhoid, 1,030 deaths from malaria, 294 deaths from dysentery, 6 deaths from hookworm, and 900 deaths from diarrhœa and enteritis. These give a total of 2,855 out of 21,485 deaths in the state. Nearly 200,000 examinations for hookworm have been made in Mississippi, and over one-third of the number were found affected. In eleven Southern states during the five years ending January 1st 1,087,666 examinations were made for hookworm, showing an infection of 33%. What would it mean to the South to banish all the hookworm disease! To do away with the hundreds of thousands of cases of malaria! To stamp out the tens of thousands of cases of typhoid, dysentery, and other intestinal diseases! All of this is possible by the construction and use of two sanitary closets at each home by thorough house screening and by the use of pure drinking water.

It is a crying shame that our government gives more money for the care of pigs and goats than it gives to preserve the health of its children; that it does more for a Jersey cow than it does for a woman; that it takes better care of its mules than it does its men. Not only is the National government at fault in this particular, but our states can be accused of the same degree of negligence toward their citizens. Only a few years ago the state of Mississippi was giving $40,000 to the Livestock Sanitary Commission and $5,000 to the State Board of Health.

May the day soon come when men, women and children will be considered as valuable assets in the estimation of our state and national governments as any other livestock, and we trust that they will receive even a scant excess of consideration.

DISCUSSION

Papers of Drs. Ferrell, Way, and Whitfield.

Dr. J. H. Florence, Houston, Texas.—I have been very much pleased with the trend of these papers. I am glad to see that stress is being laid upon the health of the rural communities, because this is a subject which has been greatly neglected in the past. It is true that the cities have taken care of themselves largely, but the rural communities have been neglected.

There is one thing I want to impress upon you and that is the importance of a whole-time health officer, and this whole-time health officer should be a specialist, and the peanut politician will never be relegated to the rear until we have a whole-time specialist on health matters, and we will have politics in the profession as long as reputable physicians accept this trust at less than a living wage.

I was much interested in Dr. Lincecum's paper in regard to a system of sewerage. The impres-

sion is that money is the thing that keeps us from getting sewerage systems. One gentleman said that if you want money the way to get it is to go to the legislature; that the legislature will give us all the money we want when the people demand it, and we medical men should instruct the people to demand appropriations from the legislature for these improvements. Dr. Whitfield made the point about getting money in connection with cattle, sheep, and so forth. It took one legislature only fifteen minutes to pass the Wolf bounty of $100,000, while it took them sixty days to pass a bill of $25,000 to kill rats. The difference is this, that the two hundred sheep and goat men came up from the rural districts and demanded the legislature to give this money, and they got it in fifteen minutes. In connection with the proposition to investigate the bubonic plague situation and the extermination of rats, there was one lone man who made the fight, but it took him sixty days before he got $25,000 for this work.

PELLAGRA. DIET AS THE ESSENTIAL ELEMENT IN ITS CAUSE AND CURE.

By Carl A. Grote, M.D.,
County Health Officer, Jasper, Ala.

For the past two years it has been my privilege to give my entire time to public health work in Walker county, Alabama. There are some forty practicing physicians in the county, and it has been with them that my observations of pellagra have been made. Walker county covers an area of about 875 square miles, has a population of some 44,000, and is now one of the wealthiest counties in the entire state. But this condition has not long been true. Only a few decades ago Walker was one of our most backward counties; there were no railroads to bring civilization; her hills were barren, and her valleys tilled by unprogressive white farmers. And yet, these same farmers produced at home their own foodstuffs, such as milk and butter, chickens and eggs, beef and pork, and found an abundance of wild game in the forest, which formed an essential and nutritious element of diet. Our former probate judge tells us that his own father used to boast of killing a deer every few days as he split rails in the woods of Walker county; that often in the late winter and spring their breadstuffs would become exhausted and then they would substitute breasts of wild turkeys, which had been dried during the autumn. One of our progressive farmers tells us that when a boy he remembers having seen seventeen venisons in his father's smoke house at one time. It is the rule and not the exception to have the older settlers tell us of what an important and essential element of diet wild game used to be.

About the year 1890 vast quantities of coal were found in the hills of Walker county. Large mining corporations began operation in every section until today there are thirty-three large mining camps and seven incorporated towns within the county limits. With the beginning of this transitional period a number of far-reaching changes began. The coal operators imported skilled laborers, both white and black, who knew the coal business, made good wages, and not only bought good food for themselves, but bought the native farmers' produce. Then a great many farmers, especially the unprogressive ones, abandoned their homes, sold their cows and chickens and took their large families to the mining camps. And these same unprogressive farmers usually make poor miners, and consequently a poorer living for their families.

During the year 1914 there was a minimum of 112 cases of pellagra in Walker county. Most of these cases I visited with the doctors and together we discovered the following facts: Only 11.6% of the cases were in our incorporated towns, which represent 25% of our total population. We found that from the cases that were in the towns there was no spreading of the disease, though conditions were all favorable to the spread of an infectious disease at that time. But the disease was in our mining camps and in our rural districts, and with few exceptions was found among our poorer people. From a therapeutic point of view, we became heart sickened. We tried cacodylate of sodium and most of the other recommended preparations of arsenic, iron, etc., and watched the medical journals for new remedies only to have a large percentage of our patients die as though ungrateful for our efforts. Of the 112 cases (minimum) we lost 30, or 26.7%.

During the year 1915 there was a minimum of 200 cases of pellagra in Walker county, enough to arouse the interest of laymen and to demand a closer study of

the disease by the health department. In one of our mining districts we found a very interesting situation. There are two camps in this district controlled by the same corporation and only a quarter of a mile apart. In Camp A pellagra was conspicuously absent. In Camp B there were some 20 cases of the disease, and in this camp it had seemed endemic for the past several years. In one house five cases had developed and the patients died, which house, by order of the general manager, had been torn down and burned. The people in both camps bought their foods from the same store or commissary. From these facts the company doctor and the officials were strongly impressed with the infectious nature of the disease. But upon a closer study of the situation the following facts stood out boldly: The open-back surface privy was in general use in both camps. In Camp A, which was almost entirely free of pellagra, the company officials lived, the bookkeepers, the clerks, most of the skilled miners and the negro miners. The officials stated that the negroes were good miners, made an average better wage than the white miner, and bought the best food. The company officials were vying among themselves as to who owned the best cow. In Camp B we found only one class of people—the poor native white miner who had left his country home and moved to the mining camp. The company officials stated that they were not good workers and that they didn't know how some of the families made a living. The storekeeper told us that they bought the poorest kind of food, rarely buying a piece of steak or fresh meat. By visiting the homes in this camp we found that they largely lived on corn bread, molasses, brown gravy (melted lard thickened with flour), and white meat. There were no cows in this camp. And this was the camp shot to pieces by pellagra. Three months after this survey the same company doctor writes us: "I am convinced that an unbalanced diet is the important factor in the causation of pellagra. Well nourished people do not have the disease. Since I enthusiastically adopted a diet, high in proteid value, in the treatment of pellagra, I have treated 35 cases; 28 with diet and some medication and 7 with diet alone, all of which are now apparently well. I believe diet is paramount in the prevention and cure of pellagra, though medication forms a valuable adjunct, especially in cases complicated by some other disease."

In another large mining center conditions were found almost duplicating the above described situation. In our rural districts we found that our progressive farmers who owned cows and supplied a good diet for their families did not have pellagra in their homes. In our most progressive farming community there was not a case to be found. But in other districts we did find it. We found three families in each of which there were five cases of pellagra. These people were the poorest of the poor and we were not only convinced that the diet they had was deficient in proteids, but that they often went hungry. Upon a liberal diet, which we were able to assist in securing, all of these patients, with one exception, are now apparently perfectly well. The one exception was an imbecile boy who had a tubercular spine, developed pellagra and only lived a few weeks.

So convincing to us was the evidence against an unbalanced carbohydrate diet as the essential element in the causation of pellagra, and a diet consisting largely of milk and eggs, lean meat, peas and beans as a cure and prevention of the disease, that we began a pellagra campaign. The newspapers carried our many articles for us; in public health lectures delivered in every section of the county the problem was fully discussed, and people generally were urged to use a proteid diet in addition to any medical treatment for pellagra. During 1914 we had 112 cases, resulting in 30 deaths, or 26.7%. In 1915 we had 200 cases and 32 deaths, or 16%. These figures may be misleading, but the fact is that the doctors of Walker county are, with few exceptions, enthusiastic in a campaign to wipe out the disease. One of our best students and practitioners writes us: "During the year 1915 I treated 60 cases of pellagra and had one fatality. This death occurred before I began earnestly the use of a proteid diet in its treatment. I have had just as good results with those patients I treated without any medicine as those given medicine in addition to diet. I am convinced that an unbalanced diet, lacking in proteids and excessive in carbo-hydrates, is the es-

sential element in the causation of pellagra. Not a single one of my patients owned a cow when the disease developed, but I am getting them to understand the problem and to secure cows." Other doctors are just as enthusiastic, the people of Walker county have become acquainted with these facts, and we fully expect to have less pellagra during the next year.

CONCLUSIONS.

From all of the evidence that we have been able to gather in Walker county we believe that the following conclusions are justified:

1. Well nourished people do not have pellagra.
2. The diet of our backward farmers, and farmers who have moved to the mining camps, has undergone a serious deterioration in nutritive value during the past few decades.
3. In our cases of pellagra there is the sameness of diet, excessive in carbo-hydrates and deficient in nitrogenous elements.
4. Pellagrins as a class do not own cows, consequently are deprived of milk.
5. A well balanced nutritious diet, in addition to almost any medical treatment with its psychic effect, will cure most cases of uncomplicated pellagra.
6. It is the duty of our boards of health to teach and demonstrate to the masses that pellagra can be cured and prevented.

THE SOIL AS A POSSIBLE MEDIUM FOR THE ETIOLOGICAL FACTOR OF PELLAGRA.

By C. C. Parrish, M.D.
Fort Worth, Texas.

Not only do I believe the soil to be a medium for pellagra, but, like Dr. J. L. Jelks, I believe that it is an intestinal infection. When I treated my first case in 1909, I gave it thymol because I thought it was a case of hookworm infection, notwithstanding the fact that it had been diagnosed pellagra by a county medical society where they had seen more than a dozen cases, and when the case recovered from that attack as the result of the thymol, I wrote an article calling attention to the similarity of the symptomatology of the two diseases, and advised the giving of thymol to pellagrins, which I am doing to this day.

Sambon says: "There would seem to be little to be gained from examination of the blood in pellagra, but the failure to find any definite microscopical parasite does not, of course, exclude some ultra-microscopical germ as possibly being the cause of the disease (compare yellow fever, denegue, etc)."

Why not some ultra-microscopical germ in the soil of the yard or garden which the women and children, we know, are more exposed to than the men, and especially the women who have the disease more frequently than the men, which may be explained by the greater frequency in which women visit the gardens.

In rural districts where there are no sanitary sewer connections, and the open privy is a common source of contaminating the soil with human excreta, we find the greatest proportion of pellagra. In our very large cities where the people are not exposed to the soil, we have little or no pellagra. It is one disease that travels *from the country* towards the cities and stops, so far as origination is concerned, where the cultivation of the soil stops and the sanitary sewer connections begin, or where the soil ceases to be contaminated with human excreta. In other words, pellagra stops where the cultivation of the soil around the surface privy ends.

My idea of prevention of pellagra would be to stop cultivating the soil where human excreta has been deposited, bearing in mind the possibility of chickens carrying the excreta from some surface privy to the garden spot many yards away; also that it may be possible for people to contaminate the soil many months before they are suspected of having the disease.

The two following family histories may be of interest in that connection.

The grandmother suffering with pellagra had lived with the family the year before, and had used the privy located in the highest elevated corner of the garden. The next year the only three members of that family of seven that worked in that garden contracted the disease. The father was away from home all day, the oldest sister was in school in a distant town, and the two youngest children were too small to be of any assistance, and they all escaped, while the mother and the only two children who subsequently worked in this garden contracted the disease.

Second. In a family where the grandfather died the year before of pellagra, the last six months

being confined to his bed, I noted that the excreta of the patient had been thrown in the weeds of an adjacent lot. The next spring the adjacent lot was turned into a garden and the following summer of the same year all of the members of that family contracted pellagra simultaneously, except the baby, which was too young to work in the garden.

These facts suggest that whatever is the medium for the spread of pellagra, it seems to be stationary and constant; also, that it is something that women are more exposed to than men; that the children and aged are exposed to it in equal numbers, and a medium that is more active in the spring, summer and fall than in winter.

The elder Strombio emphasized the point that pellagra occurred in high, dry countries. Throughout the history of the scourge all writers have agreed on the one point, that workers in the earth living in rural districts are almost exclusively the class of people affected. Recently this fact has been made use of in proving the correctness of Sambon's hypothesis.

Sambon says: "In all districts comprising both low, flat, or hilly, well watered areas, and more or less mountainous areas, I invariably found pellagra to prevail in the former and to be absent in the latter."

Also: "In non-endemic areas, such as Castione della Presolana, in the province of Bergamo, notwithstanding the presence of numerous pellagrins, I was unable to find a single case of the disease among the younger children, whether their parents were pellagrins or not. I examined with special care the children of families in which both parents were pellagrins and had contracted the disease before the birth of the children, but I was unable to detect any sign of the disease in the offspring. Indeed, these children differed in no way from the children of non-pellagrin parents living in the same locality."

"Both physicians and peasants told me of pellagrins whose elder children, born in a pellagrous district, were also pellagrins, whilst the youngest, born after the removal to a healthy locality, were entirely free from the disease. On the other hand, it has frequently happened that in a family the four, five or more healthy children born in a pellagra-free district acquire the disease all at the same time on taking up residence in a pellagrous locality."

Wood: "It has always been held in Europe that the disease is almost exclusively limited to field laborers, and from the earliest writings we learn that Frapolli, Gherardini and Odoardi, as well as many others, considered it a disease entirely of the rural sections and that cities were veritable places of refuge from it. Sambon found that the majority of cases examined by him were in field laborers, but even this class was not affected except in the endemic centers. He further claims that healthy mechanics and workers in other classes of labor than agriculture would become pellagrous when they became tillers of the soil. He found the disease occasionally in coachmen, fishermen and priests, as well as in shepherds, carpenters, masons and shoemakers, but explained this by the fact that at certain seasons of the year these people would go into the fields to help out in the rush. While pellagra is known to occur quite frequently among the farming people, the fact remains that this class is not so universally affected as in Europe. Again, it is interesting to note that in America the disease is often found in the cities. Many cases have been reported from Atlanta, Mobile, New Orleans, Charlotte, Columbia and other cities. Quite notably is the occurrence of a large number of cases in the thrifty city of Durham, N. C., one of the wealthiest cities of its size in the United States. It has never been carefully enough studied to determine just how much time these victims of the cities spend in the country each year. It is a common custom in the South, as well as in other sections, to leave the cities with the approach of warm summer weather and to seek cooler places in the country."

Lavinder recently wrote: "If communicable at all, pellagra certainly does not seem to be so in any very direct way from one individual to another. Evidence is not lacking that pellagra is possibly a disease of place or locality."

PELLAGRA INVESTIGATIONS IN THE GEORGIA STATE SANITARIUM FOR THE INSANE.

By E. M. Green, M.D.
Clinical Director
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The intensive study which has been given to pellagra within the past few years has resulted in the accumulation of a voluminous literature through which one wades only to arrive at the conclusion that, while many of the writers have done individual work which justifies them in forming opinions in regard to the disease, others have expressed merely superficial impressions based chiefly upon publications which have come under their notice.

So many theories, plausible and otherwise, have been advanced as to the causation and treatment of the disease, and so warmly have they been defended by their supporters, that one who has no large experience with such cases must acknowledge a state of perplexity which does not grow less as the current issues of the journals are read.

Many problems associated with pellagra are unexplained and some of them will probably remain so for many years, but

out of the mass of theory and suggestion two facts stand out which have not been controverted—first, that pellagra has been experimentally produced; second, that recurrences of the disease have been prevented.

As an officer of the Georgia State Sanitarium, I have had an opportunity to follow closely the work which has been carried on in the institution throughout the past twenty-five months, under the auspices of the United States Public Health Service. Although the number of patients under the care of this department has, until recently, not been large, valuable statistical work has been done in addition and investigations of the mental states of pellagrins have been conducted over a period of eight months. The collected statistics, covering 1,291 cases of pellagra, show that of those patients who recovered from an attack and remained in the institution for one year or more, 59.2% had recurrences, 79.4% of which took place within the period of one year, while 16.1% occurred during the second year.

Dr. D. G. Willets, under the direction of Surgeon Joseph Goldberger, has carried 72 patients through the first year subsequent to an attack and now has under observation 125 pellagrins, some of whom will be carried through one year and the remainder through two years. Of the former number, who have completed the year, not a single recurrence has been noted, although each case is examined daily for evidences of the disease. They have been given no drugs, even the cases in which tonics were indicated received none, and by means of a full, suitably balanced diet alone, the above results have been obtained. All of these patients, without exception, have gained in weight and are among the most robust and healthy of any in the institution.

It remains to be seen whether recurrences will take place or not, but from the undoubted improvement already made and from the general appearance of the patients, we have ground to expect that they will not do so if the present diet is persisted in.

Of 43 cases treated from a therapeutic standpoint by diet alone, thirteen were excluded for reasons which seemed to be sound. In the remaining 30 cases the mortality rate was 6.6%, a record which is much lower than has been noted under any other form of treatment carried out in this institution.

If the investigations of the Public Health Service in Georgia have accomplished nothing more, they have proved beyond doubt that the employment of suitable diet alone may bring about the recovery of cases not too far advanced and that it will prevent, for a time at least, recurrences of this disease.

A PLEA FOR THE CONSERVATION OF HEALTH.*

By HARRY S. MUSTARD, M.D.
Charleston, S. C.

A few years ago there arose the term, "the tired business man." This term and the unfortunate individual who was the cause of its origin, at once became popular. The fatigued one was allowed liberties alarmingly broad, and to him were attributed virtues and vices not possessed by the ordinary mortal. He was easily peeved, of a crabbed temper, irascible in the extreme. The tiredness might manifest itself by depression of spirits, marked nervousness, with which was often associated crying spells in the strongest men, and there was as a rule an inability to concentrate the mind, or to do routine work with the efficiency of former days. Loss of weight, sick headaches, acute indigestion, impairment of gait were among the details which made up the picture of the man who was thought to be worn out by the strenuous life.

For relief the sufferer turned to the doctor, and the doctor said "neurasthenia"—a pompous, high sounding name, one fairly redolent of deep and scientific knowledge, and yet with the necessary touch of mystery to lend interest. Now, while I do not for a moment want to be understood to say that there is no such disease, because I believe that there is, I must maintain that to have neurasthenia became very, very fashionable. The doctor could

*Read before Medico-Chirurgical Club August 23, 1915.

make this diagnosis, and whether right or wrong, be sure of a satisfied patient. The prognosis for the neurasthenic was good, bad or indifferent: he might get well, he might die, or he might rock along in poor health for years. From a scientific standpoint, it could be clearly seen that for this term to cover so many and varied conditions was not satisfactory, and though we still use the name neurasthenia, it is in a far more restricted sense than formerly, and in future it will be less used than at present. And so in retrospect we can see that it has been a matter of diagnostic acumen; the tired business man was in reality a sick man, and was thought always to have neurasthenia. Now we know that neurasthenia, as formerly applied, was frequently made to cover any one of a multitude of diseases in its incipiency.

It would indeed be fortunate could the male pass through a menopause somewhat similar to that of the female, and have this time of life as a general stock taking period. We all know how the woman of forty dreads the unforseen developments which the next few years hold for her. At about this age she will usually consult a physician, and is willing to look to her health with considerable care. Many diseases that would not otherwise be detected in their early stages are thus diagnosed in the female, and at this time prove amenable to treatment.

Recently the more progressive of the insurance companies have instituted a Health Conservation department, and at stated periods the policy-holder is requested to allow that their physician make an examination of him. This, to my mind, is a long step in the right direction, and ought to meet with most beneficial results, both to the insurer and the insured.

As the years pass on, we are all subject to certain wear and tear; diseases of childhood may take the prime of life to manifest the far-reaching destructive powers of their sequelae; tuberculosis, contracted in early infancy, may strike the young man on the threshold of success; nephritis, the starting point of which was an undiagnosed and mild scarlet fever, may suddenly show its presence in an uremic attack.

Are you getting stouter? Are you getting thinner? Do you know why? Are you sure that this change which is taking place is in accordance with perfect health? This increase of weight, of which you are so proud—are you sure it is not water that is puffing out your waist line? A cirrhotic liver, coyly nestling under the diaphragm, will bring about the same profile to the belly. Or possibly, with perfect aplomb and smug contentment, you are nursing among your wrecked intestines a tumor, which by pressure is giving you this figure, which fills you with so much satisfaction.

How about those pounds that you are losing? Have you had your urine examined recently? Remember that diabetes, under certain limits can be controlled, and the fat man who is getting thin has not always reason to be thankful for this mysterious lessening of the weight which he has been carrying for years. It was only the other day that I examined for insurance a motorman who weighed two hundred pounds. He took occasion to tell me, with a great deal of satisfaction, that he had lost about twenty pounds. No, he couldn't say why. *His* urine contained 3% sugar. Remember, too, that Old General Tuberculosis first begins the training of the recruits for his army by taking off their extra and then their necessary weight.

Give the dentist a dig at your teeth. There is no greater asset than good teeth, but aside from your appearance, and your absence from toothache, bear in mind how a diseased mouth may play havoc with the kidneys and stomach. We are just beginning to realize what a large percentage of nephritis is due to some suppurating process in the gums: this poison, being slowly and continuously absorbed, acts as an irritant to the unoffending kidneys, and maims

them for the rest of your shortened life. Bad teeth and insufficient mastication always go hand in hand, and poorly chewed food is an excellent thing to bring about a chronic indigestion, with all the train of misery and discomfort that so often follows. Change in the quality of the gastric juice may be followed by ulcer, and ulcer of the stomach is a most bewitching and enticing bed on which the cancer will take illegitimate enjoyment; you are not only the Pandar to this nauseous intercourse, but you give your life as the price.

If you have ever had a venereal disease of any sort, it is to be hoped that you are keeping a careful watch upon yourself. Because you are fat and forty, don't run away with the idea that the wild flings of youth are of necessity fully paid for. Many is the man, who, after finding it hard to walk in the dark, and with some eye trouble, discovers that those pains in the stomach which he took for indigestion, are in reality gastric crises. Tabes dorsalis is not a parasyphilide; it is syphilis itself. Watch your step; don't let locomotor ataxia send you shuffling to the cemetery.

You remember the plight of the old gentleman, who, after spending the first half of his life making bread, spent the latter half making water? This ought to bring to your mind that nerve-wracking, urine stopping prostate gland. If you are yet young, be sure that there are no temporarily latent foci of an old gonorrhoea in this choice spot; if you are middle aged, get treatment before the knife becomes the only source through which you can regain comfort; if you are already in the late years, remember that, with other organs in good condition, modern surgery can do a great deal for you.

Among other wise things, Dr. Osler has said that the finding of a few hyaline casts in the urine of a man past forty has usually a most salutary effect. It makes him realize that he is no longer the young dog he once was; that if he hopes to reach old age in any degree of comfort and grace, he must get back to a quieter type of life. Continuous disregard of the fundamental laws of health will in the end bring about trouble; and the kidneys, by having their function impaired, are among the first to show the danger signals. Maybe those "sick headaches" which you have been having are not simply the result of indiscretions in diet. If the public would only watch them with half the care that they give to an unoffending but much advertised pain in the back, far more frequently would the home-made diagnosis of Bright's disease be confirmed *and helped* by the doctor. And really, you know, though the cause of old Mr. So-and-so's death was said to be "acute indigestion," and the attack *did* start with headache, nausea and vomiting, what he most assuredly had was uremia. Look with suspicion on these attacks of acute indigestion, you middle-aged gentlemen.

The taking of the blood pressure is a most efficient means of determining how the arterial pipe line is holding up under the stress and strain of disease and age. Impure blood circulating in the arteries will as surely eat out their lining and corrode their substance as would nitric acid turned into the water works of your house. Get a blood pressure reading. If too high, find out from whence comes this irritant in the blood stream. Remove it if possible. Get rid of that intestinal putrefaction which has been going on in you for years. Have your urine examined occasionally for indican, and establish a check upon how well you keep the trouble removed.

With certain men it cannot be denied that every grace they say at meal-time is an installment upon their funeral service. They eat too much. The constant cramming of an overworked stomach must of necessity mean improperly digested food, and this means more trouble in assimilation of that which is nutritious, and trouble in getting rid of the waste causes piles of discomfort and constipation. Moderate your diet; follow the precept of certain wise men in medicine, and as you grow in years past mid-life, let your food gradually approach and simulate that of early infancy.

And so with drink—anti-prohibition beverages, I mean—don't let the years go on and find you with your regular three drinks a day. Cut them out except for the rarest occasions. Alcohol has an unpleasant way of exploding sometimes; it might take the form of a cerebral hemorrhage in your case.

And now a last word about the weather. It is undoubtedly a fact that while pneumonia is due to an infection, dampness, cold and exposure are frequently the means of starting this spontaneous combustion. Most of us, I am afraid, take rather a pride in paying no attention to inclement weather, and frequently bring on colds and coughs which invite the pneumococcus to grow in their fertile depths. Though pneumonia has been called the friend of the aged, many a man, after carefully going through years of interstitial nephritis or valvular disease, will die an unnecessary death from injudicious exposure on a cold winter's night.

Gentlemen, let us take stock of ourselves. The strongest health fund can become bankrupt. And in the business of health, when failure comes, we are left to the miserable existence of one who has squandered his most precious heritage; a man without hope for the future.

AUTHORS' ABSTRACTS

Tropical Diseases and Public Health.

The Prevalence of Pellagra; Its Possible Relation to the Rise in the Cost of Food. By Edgar Sydenstricker, U. S. P. H. S., Washington, D. C. Public Health Reports, October, 1915. Reprint No. 308.

The possible relation of the incidence of pellagra to certain conditions of an economic character is suggested by certain recent observations on the relation of diet to the incidence of the disease. These observations are that there is a disproportionately small amount of proteins in the diet of those developing the disease, that pellagra can be produced by a diet lacking in proteins, and that it can be cured by a balanced diet; that the disease is prevalent principally in the South, especially in mill communities, is closely associated with the condition of poverty, and has apparently increased considerably during the last seven or eight years.

A review of the more important data relating to the diet of workingmen's families, which have been obtained in detailed investigations of workingmen's families by various investigators from the federal Bureau of Labor and other governmental as well as private agencies, affords a basis for the following tentative conclusions, pending more detailed studies of the relation of pellagra to economic conditions.

The lower the economic status of the family, the greater is the necessity for sacrifices in diet, particularly in animal protein foods, since animal protein foods are the most expensive. The economic status of native white wage earners' families in Southern mill communities is lower than in other sections of the country. The supply of protein foods in Southern industrial localities, particularly mill villages, has been restricted by a number of factors. Actual studies of several thousand typical wage workers' families in Northern and Southern industrial communities show that, under similar conditions of income and size of family, the proportion of proteins in the diet of the Southern families is considerably less and of carbohydrates and hydrocarbons considerably greater than in the diet of Northern families.

Certain factors have tended to intensify this condition in recent years, particularly since the industrial depression began in the latter part of 1907. While the supply of a better balanced diet has apparently not been improved materially, the economic status of the average Southern wage worker's family was lowered during several years of industrial depression, and retail prices of food have greatly increased. The increase in prices of animal protein foods has been over 60% greater than that of other foods. There has thus apparently occurred an increased disadvantage in obtaining animal protein foods which has affected the poorer classes of families the most.

SURGERY, GYNECOLOGY, OBSTETRICS AND GENITO-URINARY DISEASES

A FURTHER STUDY OF BONE REPAIR.*

(Part II.)

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and

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For more than two and a half years we have been working on some of the problems connected with bone repair and regeneration. In previous communications I have reviewed the literature up to 1914. The literature since that time is voluminous and, in places, contradictory. To the reader as well as to the experimenter at a certain period of his work it would appear strange that after like experiments unlike results have been obtained. This is not hard to understand after one has found almost contradictory results in his own work; the element of time and the personal equation are sufficient reasons for some of the chaos which exists.

The function of the periosteum has been variously estimated even within the past two years. To go further would be an unnecessary expense of time and a tax on your patience. One has but to refer to any one of the reviews prior to 1913.

One can not consider the periosteum without being brought face to face with several problems:

1. Is the periosteum a fibrous membrane which acts as a source of blood supply?
2. Does it limit growth?
3. Has it osteogenetic properties as a result of metaplasia?
4. What will happen if periosteum is removed from the bone?
5. Is the periosteum essential to the life of a graft?
6. Will the periosteum survive and produce bone if transplanted into soft parts, or even if elevated from bone, but soft parts are interposed between the bone and the periosteum?
7. Will defects in bone heal irrespective of its presence or absence?
8. How is callus formed?

A review of the literature is like entering a puzzle garden where the signs at every angle are contradictory.

Alexis Carrel (1912) after preserving periosteum in normal plasma for two or three days transplanted it under the skin of chest of a dog, and found that the periosteum had produced bone.

S. L. Haas (1914) concludes his work with the statement: "It is apparent that the periosteum is very actively concerned in the regeneration of bone."

McWilliams (1914): "The periosteum, when transplanted alone into the soft parts, may produce living bone."

Lexer (1914) advocated the osteogenetic power of periosteum in his address before the International Congress of Surgeons in New York in March, 1914, in these words: "In 1859 Ollier attempted periosteal transplantation and later investigators have confirmed Marchand's findings that periosteum belongs to that class of tissues which permit implantation and that it pursues its function of bone production provided that the soft medullary tissue does not come in intimate contact with bone."

John B. Murphy, in his "Clinics," February, 1914, again expressed his allegiance to the "power of periosteal strips elevated at one end from bone attached at the other to reproduce regularly bone on their under surface."

Meyer and Wehner (1914) conclude as

*Chairman's Address, Section on Surgery, Southern Medical Association, Ninth Annual Meeting, Dallas, Texas, Nov. 8-11, 1915.

From Laboratory of Physiology of Tulane University (1913-1915).

Part I. published in Surgery, Gynecology and Obstetrics, June, 1915.

follows: "Bone growth occurred in all the transplants of periosteum. (2) In the bone transplants the adult bone cells of the graft give no evidence of activity whereas the periosteum showed marked osteoblastic properties. (3) Bone macroscopically bare of periosteum can be successfully transplanted into the soft parts *because* of adherent *periosteal* cells and of living endosteal cells."

I may be pardoned for digression at this point to call attention to an apparent inconsistency on the part of these workers in their efforts to prove the side of the question to which they are prejudiced. They say "in removing the periosteum great care was taken not to transplant flakes of bone with it; the periosteal strip was not scraped off the bone with the periosteal elevator, but after outlining the area to be transplanted with a scalpel, it was gently lifted from the bone, *a simple procedure in young animals.* It was of course impossible to examine microscopically the transplanted strip of periosteum, but control examination of the bone after this procedure showed that the *danger* lay not in transplanting bone with the periosteum, as MacEwen suggests, but rather in leaving too much of the cambium layer of the periosteum attached to the bone." I wish to ask one question and then leave these statements of Meyer and Wehner to others for the answer. If the periosteum can be gently lifted from the bone in the young animal—and that it can be done there is no doubt—wherein lies the danger of leaving anything behind?

Gallie and Robertson (1914) found as a result of their experiments that periosteum did not reproduce bone, but that it acted as a limiting membrane.

Moore and Corbett (1914): "At the present time the periosteum is disregarded, knowing that it is not an essential element in the healing of bone."

Groves states (1913) that the periosteum has no power to form callus or new bone.

Davis and Hunnicutt (1915) conclude: "Free periosteal transplants did not reproduce bone in the large majority of experiments, even though osteoblasts were adherent to the transplants." "Pedunculated flaps of periosteum did not reproduce new bone." "The removal of periosteum had little if any effect on the bone."

In November, 1913, we expressed the opinion that the periosteum had no osteogenetic function. Now, after a period of two years, we have had opportunity to multiply our experiments and to study histologic sections of many of our experiments, and after all we are led again to our original conclusion: "We have never been able to note any osteogenetic function on the part of the periosteum." What seems apparent to us is the following: *The periosteum is a means of protection against infection, a source of added blood supply, a limiting membrane and its presence favors an earlier repair of defects, but the healing in its absence is bony just the same.* Citation of some of our type experiments at this point may be of interest.

In our first series of experiments (April to July, 1913), we transplanted free periosteum into the anterior chamber of a cat's eye. After six weeks it had disappeared. (2) We repeated MacEwen's experiment of elevating the periosteum from the shaft and interposing a muscle belly between the shaft and the periosteum. The result of this experiment proved interesting because *of an outgrowth of new bone* from that part of the shaft from which the periosteum had been elevated. *The periosteum showed* no evidence of giving rise to new bone formation either on its under surface or in the muscle interposed between it and the shaft. The active bone formation on the surface following removal of the periosteum has been observed so often that one is bound *to draw the deduction that the young cortical osteoblasts are easily activated by injury and may also be easily removed with the periosteum in adult animals.*

Any experimenter who has dealt with animals of all ages knows that there is no difficulty in removing periosteum from the young bone, as there one finds a definite space separating the bone from the periosteum. In the adult, on the contrary, it strips with difficulty from the bone. For these reasons it is easy to understand how one may take along many of the young and active osteoblasts when he removes periosteum in the adult. Moreover, it also serves to explain why the "periosteum regenerates" the shaft after an inflammatory process such as osteomyelitis, as during the progress of the disease the os-

teoblasts become adherent to the periosteum, and later give rise to new bone formation.

In another type of experiment we transplanted free periosteum around the carotid artery in much the same way as Halsted, Matas and Allen have suggested the aluminum band be used for obliteration of the vessel. After eleven, forty-five and seventy-nine days, respectively, there was no evidence of obliteration of the vessel, nor outgrowth of bone from the under surface of *the periosteum.* (See Protocol of Experiments.)

In many of our transplant experiments the fibula was resected subperiosteally and the periosteal tube left behind was closed. *In no instance did we note a regeneration of the fibula from the periosteal sheath.* Whatever new formation resulted seemed to be from the ends of the bone, and that growth was not marked, in most instances being cartilaginous in character and only enough to cause a knob-like covering over the ends of the bone.

Two other types of experiments seemed to offer hope for solving the necessity of periosteum in regeneration of bone — fractures and defects in which all of the elements were left on the one *bone* and periosteum was removed on the corresponding bone of the opposite leg.

Our hopes were more than realized by the results for, on the whole, these experiments have been more satisfactory than any others we have undertaken. Last year we reported some of our results before this body, and since then we have verified our previous results as well as carried out fracture experiments from one to seven days and from six to twelve weeks. Thus our fracture experiments now include animals sacrificed from one day to twelve weeks.

Before detailing the experiments or our findings it may be of interest to digress here for the purpose of seeing what can be obtained from the literature that we may be in better position to compare former findings with our own.

As early as 1741 Duhamel attributed callus formation to the ossification of the periosteum and medullary tissue.

But little opportunity has been offered for the study of human callus. So far as I can find, Orth is the only authority who reports having examined human callus. His case was that of a man of eighty years who died fifteen days after a fracture of the lesser trochanter. In the study of sections from the case he did not find true osteoblasts in the callus, but there was evidence of metaplastic changes from connective tissue to bone. He observed *cartilage in the callus.*

Zondek (1910) made a series of experimental fractures on mice. In a six-day fracture he found between the ends of the bone new tissue formation which was rich in cells which were being transformed into cartilage cells. There was well developed cartilage cells as well as osteoid tissue. In later stages of development of callus he noted a gradual replacement of "formative tissue" by cartilage and this in turn by osteoid tissue. Zondek attributes an osteogenetic function to the periosteum in callus formation.

Geumbel (1906) is an advocate of metaplasia and he concludes from his experiments that the periosteal as well as the marrow callus arises from the osteogenetic layer of the periosteum.

Pochhammer is convinced of the importance of periosteum in producing cartilage and bone after fracture.

Phemister (1914) still maintains that callus is composed of a periosteal, a medullary and an intermediary portion. "The periosteal callus forms almost entirely by a proliferation of the inner cambium layer of the periosteum. *The more superficial bone cells* may decalcify and multiply as may also the cells of Volckmann's canals, but their part in the formation of callus is a minor *one. It* begins to form from within the first 24 hours." "The medullary fibrous callus forms from a proliferation of the endosteum and fibrous tissue of the ends of the medullary canals."

"The *intermediary* fibrous callus forms last from an ingrowth of the periosteal and endosteal callus of the fragment ends. Bone of this callus comes from the fractured surfaces of the fragment ends." *"Ossification always begins on the surface of the bone and extends gradually to the more distant portions of the callus."*

Moore and Corbett (1914) state that "bone deprived of periosteum and then

completely fractured heals without cartilage."

A very interesting piece of work by Bergel (1910) emphasizes the importance of fibrin in callus formation. He injected fibrin under the periosteum and noted a reactive *proliferation of the entire periosteum.* He takes pains to make clear that the osteoblasts correspond to the *cell layer immediately next to the bone.*

Analysis of 19 fracture experiments on animals where we simultaneously fractured both fibulae, leaving the periosteum intact on one and removing it from the neighborhood of the fracture on the other, shows a marked uniformity in results and a definite progression of repair corresponding to the element of time expended in the particular experiment. A summary of our results is all that can be given in the time allotted to such an address.

Repair of fractures takes place in stages which overlap. The periosteum acts as a limiting membrane, preventing the large cuff of callus often seen in those bones from which periosteum has been removed. It acts apparently as a protection for the easily activated cell layer lying directly on the surface of the bone.

The early response to an injury such as a fracture consists in a proliferation of the cell layer immediately on the cortex of the bone; an active connective tissue proliferation, over the ends of the broken bone, particularly if apposition is not good. As a practical deduction one might suggest that in many cases of incomplete reduction of deformity following fracture, this new connective tissue-protective covering may be a source of delayed union. During the early stages the ends of the bone show no evidence of active proliferation.

In the absence of periosteum new connective tissue bridges over the defect and acts as a splint. In an eight-day fracture my colleague, Dr. Mann, reports evidence of a "transition of small connective tissue cells through fibro cartilage to typical bone." "The periosteum seems distinct from the bone formation." Within fourteen days there is evidence of a cartilage pad covering the broken ends of the bone. After eighteen days the cartilage pad is seen to be midway between new bone, which is nearer the fractured ends. The periosteum seems still inert so far as callus formation is concerned. After twenty-seven days there is evidence of fibrous bone formation from the ends of the old bone.

In a thirty-eight day specimen one notes the newly formed bone of the callus on either side of a central pad of cartilage, with the periosteum above. Here, more than in any specimen, we have (18L) the periosteum clearly distinct from the proliferation osteoblasts. In the control experiment of the same duration in which the *periosteum was removed the callus is made up of the same elements as in the preceding experiment with this difference* that the size of the callus is greater but not so far advanced in its development.

Seven and eight week fractures present the cancellous new bone formation more highly developed between the ends of the bone, but still separated by a pad of cartilage. (See Protocol of Fracture Experiments.)

Before drawing conclusions as to the origin of the callus it may be well to outline the experimental results we obtained where a defect was made in one side of the shaft with a trephine. On one leg the periosteum was sutured over the defect and on the other leg we removed the periosteum in the neighborhood of the trephine opening. The animals were sacrificed after seven, nineteen and seventy-six days, respectively. After seven days the edges of the old bone gave no evidence of a reparative process, except in the region of the medullary surface of the bone. The trephine opening is filled with a delicate connective tissue plug, many of the cells being elongated spindle cells. At some distance from the trephine opening on the shaft underneath the periosteum there is a marked proliferation of bone and hyaline cartilage. The endosteum opposite the trephine opening also shows some activity from irritation.

In the absence of periosteum, for the same period, the appearance is the same with the addition of a more pronounced medullary proliferation.

After nineteen days the inner half of the trephine opening has become completely filled up with bony trabeculae arising from the medulla. The plug of connective tissue above is being invaded by proliferating, subperiosteal blood vessels.

The subperiosteal proliferations of bone has almost reached the region of the trephine opening.

The seventy-six day specimen showed the trephine opening closed by bony trabeculae "which have grown up into the trephine opening from the endosteum" (Mann). The difference between the specimen on which the periosteum was left intact is that the "defect is filled up to a much greater extent." There is but little evidence of activity on the part of the peripheral and interstitial lamellae of the shafts of the old bone. (See Protocol of Experiments 44, 42, 43, 3.)

These experiments show more conclusively than complete fractures the origin of callus.

1. It may then be said that the *endosteum and the cortical osteoblasts lying under the periosteum are the source of callus formation.*

2. That the absence of periosteum only slightly retards callus formation and in no way interferes with a true bone callus formation.

3. That cartilage is always present in animal callus and that the experience of Orth suggests its presence in human callus, even in the aged.

4. A study of our specimens suggests the important nutritional and protective value of the periosteum.

THE FATE OF THE TRANSPLANT.

The fate of the transplant has been variously estimated. In 1913, after our earlier experiments, we were led to make the statement "small free bone transplants, free of periosteum and individual blood supply may grow." This conclusion was based on small transplants which had been made into the rectus muscle. The following quotations are taken from our original paper, read in Section on Surgery, Southern Medical Association, Lexington, Ky., November, 1913:

"The resume of the histological examination of these specimens given in words of my colleague, Professor Gustav Mann, is as follows:

"The result of histological investigation shows that after transplantation of a piece of a rib into the rectus muscle, spleen, and after wrapping up of a fragment of bone in the omentum, there is no indication of absorption after five weeks." "The piece in the omentum is least active, that in the spleen shows distinct signs of bone formation. The Howship's lacunae on the surface are well marked; lying in the lacunae are osteoblasts. The best evidence of active bone proliferation of bone was seen in the rectus muscle."

"The appearances seen here are identical with those seen in the jawbone of a newly born kitten. The bony trabeculae are lined with bone-forming cells arranged so close together as to almost form the pallisade. From the projecting points of the trabeculae streamers of osteoblasts pass out into surrounding tissues. It is always easy to tell whether any particular surface or trabecula is actively engaged in bone formation because of the deep staining of the cells and cell nuclei, for they will remain after the other cells have become decolorized."

A little later C. A. McWilliams (January, 1914), stated that "living bone grafts have life inherent in themselves and are capable of permanent growth, even transplanted into the soft parts."

Gallie of Toronto (1914) concludes: "These experiments demonstrate that following successful transplantation of such bone grafts as the above (resection of bone and immediate reimplantation in the original bed) the following changes occur:

1. Death of the grafts.
2. Revascularization of the graft.
3. Concomitant absorption of the dead bone by the bone cells which invade the graft along the route of the new blood vessels."

Dr. F. H. Albee, in discussing Gallie's paper, stated that grafts had been broken and later found to have been united showing evidence of activity of the *cells of the graft.* However, from his later writings one sees that Albee is not entirely of the opinion that the bone graft is a permanently active osteogenetic agent. In the Mutter lecture for 1914, Albee states: "Cellular life may be quite independent of organic or somatic life and under favorable conditions tissue cells retain their viability long after being detached from the living organism. The duration of this cellular life is dependent on the methods of preservation and the type of the cells. The more highly specialized necrose in a short time." Further he says: "The bone graft always acts as a stimulus to osteogenesis to the bone into which it is engrafted." "It seems very probable that

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the amount of haversian blood supply is in a very large degree, if not wholly, responsible in determining whether the bone graft lives as such or acts as an osteoconductive scaffold."

Phemister, in speaking of the fate of bone transplants, concluded that "the bone cells except for a small number about the surfaces of the cortex undergo necrosis and absorption."

Meyer and Wehner's results are in accord with Barth, Marchaud, Axhausen, Fragenheim, that all the bone cells of the transplant necrose. Every one is familiar with the dictum of Murphy, "Bone with or without periosteum transplanted in the same individual and contacted with other living osteogenetic bone at one or both ends always becomes united to the living fragments and acts as a scaffolding for the reproduction of new bone." "The transplant, no matter how large or how small, is always ultimately absorbed."

Since our first report in 1913 we have had occasion to transplant bone minus its periosteum into soft parts (Experiments 1, 6, 37, 24, 35) and to make intramedullary transplants as well as inlay transplants (Experiments 17, 19, 21, 30, 29, etc.). Although these experiments were done early in 1914, the histologic reports have only recently been obtained. Therefore, we were dependent on microscopic appearances and X-ray findings for our conclusions. Both of these lead to conclusions which, although not wrong, are not entirely true. For example, in a paper read before the Mississippi Valley Medical Society, I stated: "None of our transplants have been absorbed. Ninety-one days is the longest period during which any animal has been observed." This statement was based on the fact that the transplants when found had not decreased in size; but when one sees a microscopic section of such a transplant he is surprised to find at times that the cortical layers of the bone alone remain compact, while *the interior of the bone has lost its compact characteristics.* (See Protocol of Experiments, No. 37.)

We were also led to believe that the transplant was living by the X-ray appearance. A critical analysis of our transplants into soft parts shows that the transplant usually becomes invested by a new connective tissue capsule, with no evidence, *as a rule,* of proliferation on the surface. The haversian spaces may be lined with osteoblasts (as in Experiment I) or there may be marked central necrosis as in Experiment 37. (See Fig. 3.) In only one specimen have we evidence of marked activity on the part of the transplant, and this was in our earliest series, and it led us to believe that a like condition might be expected. The microphotograph of the section (Figures 1 and 2) is sufficient evidence in itself of the truth of our original conclusion that small free transplants may live, but we *now add* that it is the exception. *It is our belief that the transplant as a rule will be ultimately absorbed.*

THE FATE OF INTRA-MEDULLARY TRANSPLANTS.

In an attempt to study the fate of the transplant when contacted with bone, we performed fifteen experiments. All of

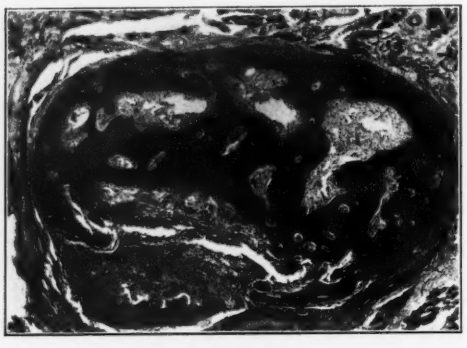

Fig. 1.

Actively Growing Bone Transplanted Into Muscle (5 weeks).

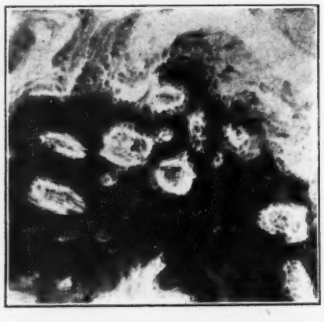

Fig. 2—High Power of Fig. 1. Actively Growing Bone.

the specimens have not been sectioned, but several deductions can be made from the study of those so far examined.

1. Notwithstanding some statements to the contrary, wherever we have had any infection, the result has been the same—the graft has not become attached to the recipient bone. (See Protocol, Experiments 1, 6, 37, and Experiment 2, April, 1913, and microphotograph of active bone growth in rectus muscle.)

2. Intra-medullary transplants *stimulate osteogenesis on the part of the endosteum of the recipient bone.*

3. *The transplant dies.* (See Protocol, Experiments 15, 34, 41.)

4. After variable periods the defect into which transplant has been placed shows new bone formation. There is, after ninety days, no distinct line of demarkation between the old bone and the new bone. The transplant seems to act as a scaffold to direct the growing blood vessels and bony trabeculae from the endosteum and the cortical osteoblasts.

5. Though the transplant dies and is absorbed by the body in the absence of infection, it does not act as a foreign body. (See Protocol, Experiments 17, 19, 21, 29, 30.)

PROTOCOL OF EXPERIMENTS.

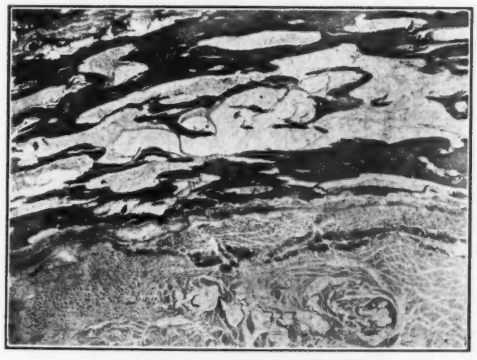

Fig. 3.
Free Rib Transplant Into Muscle.

Experiment XXXVII.—Function of Periosteum (See Figure 3).—April 29, 1914. Young male. Subperiosteal resection 2 inches of rib (right). Transplanted free rib into erector spinal muscle.

Died June 30. Transplant found where it had been put invested with a capsule. Bone through capsule looked healthy. Preserved.

Ribs: The **gap has not been filled except slight** evidence of activity at each end of resected bone.

Experiment II.—(See Figure 4.)—Dec. 16, 1913. Bitch. Periosteal cuff was placed around carotid artery.

Jan. 30. Carotid artery was exposed a second time; a band of tissue was seen around the carotid where the periosteum had been transplanted. The carotid circulation had not been interfered with.

Histologic: 45 day transplant of periosteum around carotid as a band. Healthy carotid with vagus and sympathetic. Periosteum can not be made out. **No trace of bone anywhere.**

Experiment XLIV.—Repair of Defects. 7 Days.—June 22, 1914. Young male dog. Left tibia exposed; periosteum incised and removed about 1½ inches square. With an electric trephine a button was removed—opening medulla—skin sutured—right tibia exposed. Periosteum incised—retracted. Similar button removed. Periosteum sutured over the defect, skin sutured. Sacrificed after seven days, June 29. One week. Left leg: wound healed by primary union. Large organizing blood clot over seal of trephine. Left undisturbed for histological examination. Right leg: primary union; organizing clot over trephine area. Undisturbed.

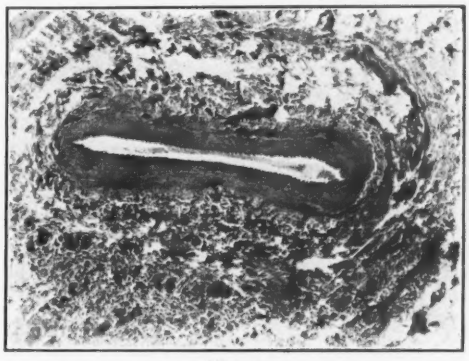

Fig. 4.
Exp. 2—Periosteal Transplant Around Carotid Artery.

Same as 42.

HISTOLOGICAL REPORT.

44R (Periosteum Intact.) — (Figure 5.) — The opening made by the trephine shows a clean cut through the bone extending from periosteum to the medulla. The edges of the old bone as far as the peripheral and shaft proper are concerned show neither bone proliferation nor degeneration of the bone, but in the region of the medullary surface of the bone the medullary trabeculae in the neighborhood of the trephine opening show considerable proliferation. Some of the bony trabeculae are extending from the medullary surface into the trephine opening, which latter is filled by a plug of very delicate connective tissue, many of the cells being elongated spindles. The center of this plug shows blood vessels with well formed walls, but here and there outside these vessels red blood corpuscles seem to be lying free in the spaces between the con-

nective tissue cells. In close contact with the free ends of the bone extravasated blood corpuscles are seen on one side. These corpuscles are slightly smaller than those in the blood vessels and probably are the remnants of the original hemorrhage. A few fat cells are also seen in the plug, suggesting that this delicate connective

Fig. 5.

tissue is derived from the medulla and not from the periosteum. In the center of the plug is a nucleus of necrosed red blood corpuscles. As far as the periosteum is concerned, it is composed of much coarser cells than are found in the trephine opening.

At a distance equal to three times the diameter of the trephine opening, **the bone immediately underneath the periosteum shows intense proliferation.** The cells resembling very cellular hyaline cartilage where the trabeculae spring from the bone the cells have more the characteristics of osseous tissue. In the middle zone they become distinctly hyaline cartilage, while at the extreme periphery they again resemble fibrous cartilage with apparently some bone-forming cells covering the trabeculae. The bony trabeculae inside to medulla of the bone are very cellular, white connective tissue fibres radiating into the medulla, forming coarse bundles of white fibrous tissue. The shaft of the bone opposite the trephine opening also shows a slight reaction set up by irritation.

44L. Periosteum removed (7 days)—The appearances are precisely as those just described, with the difference that the very delicate connective tissue in the trephine opening derived from the medullary tissue has spread out over the free outer edge of the bone where the periosteum has been removed. Over the plug a good deal of hemorrhage has occurred and lying between the masses of blood corpuscles are degenerated muscle fibres. On the medulla the proliferation of the trabeculae is more pronounced than the previous specimen, the proliferation having extended to the **opposite portion of the shaft.**

Experiment XLII.—Repair of Defects—.Not Fractures. 19 Days.—June 10, 1914. Male adult. Left tibia exposed—periosteum incised about one inch longitudinally—elevated with periosteotome and reflected on either side. With a small electric trephine the medullary canal was opened. Periosteum sutured over the cleft. Wound closed. **Right tibia exposed in a like manner except that** the periosteum **was removed** in the vicinity of the trephine opening; wound closed.

Animal sacrificed June 29. Right leg wound healed primarily. Specimen shows defect covered by dense tissue. When this is incised the opening is plainly seen. It contains a greyish substance, which was not disturbed. **Left leg: The** defect is covered by dense tissue. Palpation reveals its presence.

42L.—(19 days plus periosteum) (Figure 6).—Nineteen days after making a trephine opening the changes found closely resemble those previously found, with the difference that the repairative process has become much more marked, thus the essential feature of repair, namely, the filling up of the gap, has now progressed so far that the inner half of the trephine **opening has become** completely filled by **trabeculae arising from the medulla.** The outer surface of this newly formed **bone is convex** and sharply defined against the connective tissue plug which we saw in the last specimens (44) and which now is being pushed outward toward the periosteum. The proliferation of the bony trabeculae in the medulla has led to complete filling of the medullary canal to 75% of its extent in a region opposite to and about three times the diameter of the original trephine opening. The plug of connective tissue in the trephine opening has become invaded on its sides and in the center by proliferating subperiosteal blood vessels. Where the plug is in

Fig. 6.

contact with the bone which is being pushed into the trephine opening the blood vessels have become considerably compressed. The characteristics of all the blood vessels is that all their endothelial cells are relatively thick. The subperiosteal proliferation and transformation of bone into cartilage described in a previous specimen has now extended from the periphery toward the trephine opening till the distance of this pro-

liferating bone is now only from one-half to three-quarters the diameter of the trephine opening—from the trephine opening—in other words, the subperiosteal bone formation starts at a distance from the trephine opening and then gradually the proliferation extends towards the opening. At this period the whole of this proliferated bone appears to be **true bone with none** of the features of hyaline cartilage as seen seven days after the operation. The surface of the old bone

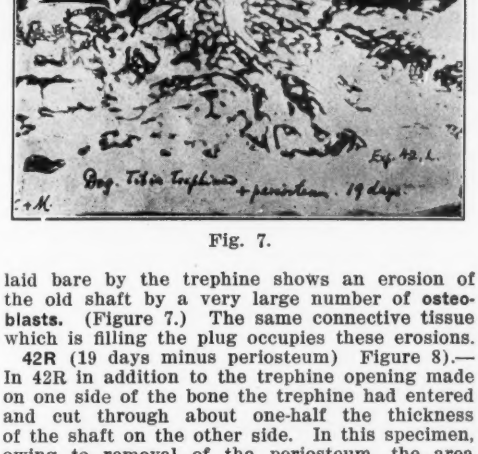

Fig. 7.

laid bare by the trephine shows an erosion of the old shaft by a very large number of **osteoblasts.** (Figure 7.) The same connective tissue which is filling the plug occupies these erosions.

42R (19 days minus periosteum) Figure 8).—In 42R in addition to the trephine opening made on one side of the bone the trephine had entered and cut through about one-half the thickness of the shaft on the other side. In this specimen, owing to removal of the periosteum, the area immediately around the trephine opening is devoid of all tissue excepting the very delicate connective tissue which has grown out from the medulla. This plug shows very active proliferation of blood vessels, the direction of which are at right angles to the long axis of the bone. The vessel walls are again thick. The general matrix of this plug apart from the connective tissue elements is composed of organizing blood clot. The most striking feature is the great proliferation of the medullary trabeculae over the inside of that surface of the shaft, the inner side of which was cut into by the trephine. The circular depression made by the trephine is completely filled up by newly formed bone. The opening made by the trephine shows but **few medullary trabeculae growing into it at its bottom.** The subperiosteal surface of the old bone shows again at a distance of one and a half times the diameter of the trephine opening active bone proliferation.

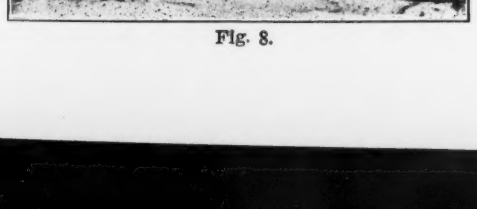

Fig. 8.

At the margin of the old periosteum which was left numerous blood vessels are seen and between these vessels very numerous spherical or ovoid shaped cells with one, two or three nuclei, in many ways resembling osteoblasts. The origin of these could not be traced.

The shaft of the old bone has a few osteoblasts attached to it on the free surface, but no active erosion of the bone is taking place.

Experiment XLIII.—76 Days.—June 19, 1914. Male. Left tibia exposed. Periosteum denuded from area one inch square removed with scissors. With an electric trephine a small button of bone was removed; the medulla was left open. Sutured muscles and skin over cleft. Right tibia exposed — periosteum incised and retracted. With an electric trephine a similar button was removed. The periosteum was sutured over the cleft. Killed September 2 (76 days). Right leg:

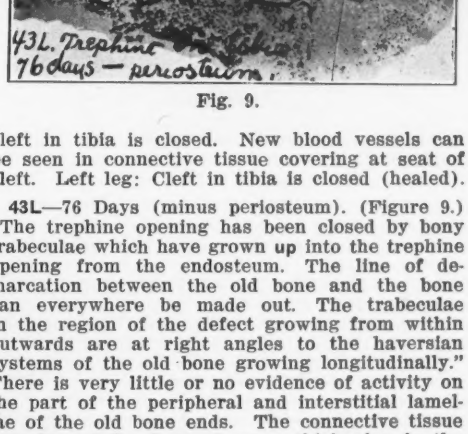

Fig. 9.

cleft in tibia is closed. New blood vessels can be seen in connective tissue covering at seat of cleft. Left leg: Cleft in tibia is closed (healed).

43L—76 Days (minus periosteum). (Figure 9.) "The trephine opening has been closed by bony trabeculae which have grown up into the trephine opening from the endosteum. The line of demarcation between the old bone and the bone can everywhere be made out. The trabeculae in the region of the defect growing from within outwards are at right angles to the haversian systems of the old bone growing longitudinally." There is very little or no evidence of activity on the part of the peripheral and interstitial lamellae of the old bone ends. The connective tissue covering of the bone shows a thickening in the region of the defect, the connective tissue making up the difference due to the as yet incomplete filling of the defect by the cancellous tissue."

43R.—76 Days (Figure 10) "Shows the defect filled up to a much greater extent than in the bone (43L) deprived of its periosteum. Here again the irregularity in the arrangement of the haversian systems in the regions where the defect was made is very apparent. The anterior surface of the bone in the region where the defect was made shows a distinct depression which is filled up with dense connective tissue.

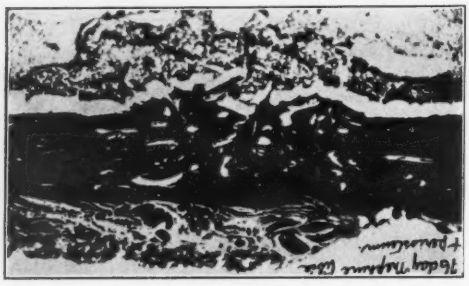

Fig. 10.

Experiment III.—Dec. 18, 1913. Trephine button outer table placed in sterno-mastoid muscle.

Jan. 30, 1914.—Killed. Fragment of bone still present in sterno-mastoid. Had not increased in size; if anything, it had decreased in size. Trephined portion of skull preserved. No apparent portion of bone not replaced by new formation.

It is of interest to note that outer table of skull showed less activity than entire bone as shown in previous experiment (first series). Probably due to fact that new channels had to be prepared to take the place of diploe present in the entire bone.

Histologic: Outer table of skull removed with **trephine.** Defect healed up from cancellous bone between the two tables. The defect filled with very much finer trabeculae than seen in the bone some distance from the trephine. This section is comparable to 42, 43, 44.

FRACTURE EXPERIMENTS—Duration one day

Experiment XV.—March 8, 1915.

Fractured right fibula—removed periosteum from vicinity of fracture.

Fractured left fibula—left periosteum intact.

Killed March 9, 1915.

HISTOLOGIC REPORT.

Section of Experiment XV (L) plus periosteum.

Nothing except hemorrhage and broken up muscle fibres is notable.

No section has been made of 15R.

Duration two days.

Experiment 16.—March 12, 1915. Young male dog. Repetition of Experiment 15.

HISTOLOGIC REPORT.

Specimen 16R—a two-day fracture minus periosteum. "Apart from the ordinary changes due to trauma, the breaking up of muscle fibres and connective tissue, **no changes are seen,** except in the spicules of bone which were removed when the periosteum was scraped away. These spicules lie amongst broken up muscle fibres, and the bone cells seem to be dead. Their nuclei stain much less than those of the intact bone. The nuclei in some of the pits on one of the pieces of the shaft show deep staining as if they were about to proliferate. There is considerable hemorrhage **and fibrin** over the free ends of the bone."

No sections have been made of 16L.

Experiment 11.—Duration Three Days.—Feb. 19, 1915. Old male dog.

Repetition of above experiments.

HISTOLOGIC REPORT.

Specimen 11R—a three day fracture minus periosteum.

"Hemorrhage emgorgement of connective tissue and muscle around bone. Muscle fibres are broken up and are in a dying condition. **There is no trace of proliferation of bone either in the medulla or under the periosteum."**

Experiment 13.—Duration Five Days.—Young bitch. March 3, 1915.

Repetition of preceding experiments.

HISTOLOGIC REPORT.

Specimen 13L, a five day fracture **plus** periosteum.

"One of the shafts shows a slight subperiosteal bone proliferation. Included between the ends of the bone there is muscle tissue—hemorrhage."

13R not reported on.

Experiment 14.—Duration Six Days.—March 3, 1915.

HISTOLOGIC REPORT.

Specimen 14L, a six day fracture plus periosteum.

"The ends of the shaft form an acute angle. The free edge of the bone is polished, being covered by necrosed connective tissue, with very slight proliferation of bone cells close to the periosteum. In the other piece of the bone, however, there is very considerable proliferation evidenced by long spicules of bone covered by osteoblasts running **parallel** to the surface of the old shaft. **The periosteum seems distinct from this proliferation of new bone."**

Specimen 14R—a six day fracture minus periosteum.

"One of the fragments of bone shows no proliferation whatsoever, while on the surface of the other fragment there is a very active proliferation of the surrounding connective tissue. The peripheral haversian canals are filled with cells of the more deeply lying haversian canals. Small spicules of bone detached by the periosteotome lie in the connective tissue matrix, with nuclei swollen and staining less deeply than the shaft of the bone. There is very light activity over limited areas of the subperiosteal osteoblasts."

Experiment 7.—Duration Seven Days.—Young male dog.

HISTOLOGIC REPORT.

Specimen 7R—a seven day fracture minus periosteum.

"One of the fragments of bone apparently completely denuded of periosteum is showing no

change. The region between the two ends of bone contains young connective tissue, made up of spindle-shaped cells, with numerous capillaries and large lymph spaces. The other fragment of bone has undergone a marked subperiosteal bony proliferation. The periosteum covering the newly formed bone is absolutely distinct and is not giving rise to newly formed bone corpuscles, but the periosteum seems to serve a nutritional purpose, which is not the same as saying it gives rise to bone cells." (Mann.)

Experiment 4.—Duration Fourteen Days.—Repetition of other experiments.

Specimen 4L—a fourteen day fracture plus periosteum.

"The most marked feature is an enormous proliferation on the surface of the shafts of the bone giving rise to subperiosteal cancellous bone. The regions between the broken ends is **filled with a solid pad of hyaline cartilage."** (See diagram 14L.)

Experiment 6.—Duration 28 Days.—Feb. 5, 1915. Young brown female.

HISTOLOGIC REPORT.

"The specimen presents the same histologic picture seen in a previously reported specimen" (18L S. G. O., Repair of Fracture).

Experiment I.—Duration Six Weeks.—Jan 27, 1915. Young bitch.

Killed March 10, 1915. Examination after death showed firm union of both fractures; the cuff of callus was equally as large on the fibula which had been denuded of periosteum as on the fibula which had not had the periosteum removed.

HISTOLOGIC REPORT.

On Experiment IR—Six weeks fracture minus periosteum. Explanation of microphotograph.

1. Plug of cartilage invaded by vessels from the periosteum and traversed in various directions by fibrous tissue derived from the periosteum.

2. Cancellous bone invading the periosteum on the left side between 1 and 2a and by clumps of budding blood vessels. In this region the cartilage cells have been almost completely replaced by fibrous tissue coming in at an angle to the long axis of the bone from the periosteum. On the other side of 1 where it abuts on 2b, the cartilage matrix is invaded by blood vessels in the same way as at the junction of epiphysis and diaphysis in normally developing bone. The whole region of the callus immediately underneath the periosteum is again rich in osteoblasts, the newly formed bone is characterized by very large haversian spaces. Strands of connective tissue forming the new periosteum form a capsule to the callus.

HISTOLOGICAL REPORT.

Experiment 1L. (Figure 11.) Left six weeks plus periosteum.

1a Hyaline cartilage well marked where it abuts on No. 6, representing newly formed, somewhat cancellous bone trabeculae. 1b, a plug of small connective tissue cells with a very little matrix surrounding them. Where the plug passes over into the general periosteum (No. 7) the fibrous matrix is gradually developed more and more. Large blood vessels at the junction of 1b and 1a (a few scattered blood vessels in 1a). The newly formed bone (No. 6) arranged in trabeculae running parallel to the long axis of

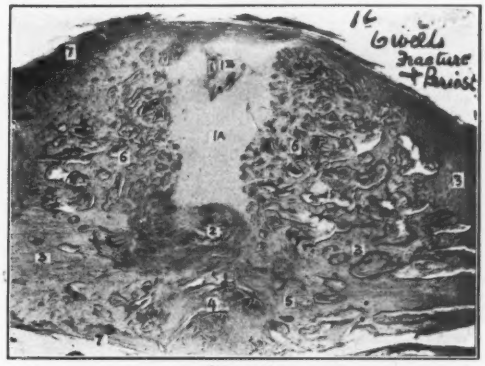

Fig. 11.

the bone is very vascular. The line of demarkation betwen 1a and 6 is very marked. The cartilage cells toward the center of 1a are smaller and not regularly arranged as where 1a abuts against 2. In this region (No. 2) dense white fibrous tissue forms the bridge between the broken ends of the shaft. No. 3 represents compact old bone with small haversian canals, while the newly formed bone shows large haversian spaces with marrow devoid of all fat cells. 5, transition of old bone into fibrous connective tissue and cartilage, which connective tissue forms a dense plug at 4.

The newly formed callus shows along 7b immediately underneath the periosteum a large number of osteoblasts.

6. Cancellous tissue, passing at 6a into hyaline cartilage of fibro cartilage.

Experiment II.—Male. Jan. 29, 1915.

Right fibula exposed—periosteum removed for ½ inch circumferentially.

Fibula fractured transversely—sutured wounds with catgut.

Left fibula similarly exposed—periosteum not interfered with; fibula fractured as usual.

Killed March 19, 1915. Wounds healed primarily. Both fractures united with large amounts of callus surrounding the site of previous fracture.

Experiment 2R—Seven Weeks.—Minus periosteum.

There is a fusiform swelling on the shaft of the bone. Complete osseus union. In the region of the center of the callus the bone is deposited on remnants of cartilage. The haversian spaces are large and filled with marrow. Fairly numerous osteoblasts on the trabeculae. On one side of the callus two patches of dense white fibrous tissue merging over into cartilage similar in appearance to that found after eight weeks (3R). On the opposite side of the dense connective tissue and cartilage, bony union is much more complete. New periosteum is about to be

formed—very numerous osteoblasts on the surface of the trabeculae next to the reformed periosteum.

Experiment 3L—Eight Weeks—.Plus Periosteum (Figure 12).—The two ends of the bone along one side extending over one-third of the diameter are firmly united by bone, while the remaining two-thirds is filled with a mass of

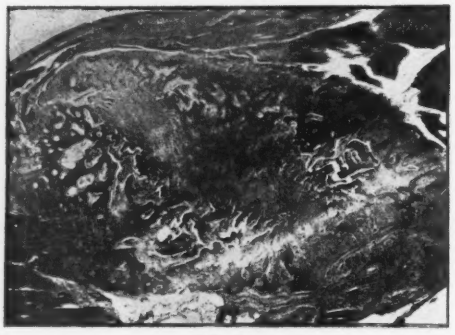

Fig. 12.
Exp. 3L—Fracture, 8 Weeks Plus Periosteum.

very fibrous hyaline cartilage. This cartilage abutting against the connective tissue capsule. The bone on either side of this pad of cartilage is comparatively dense, the bone being deposited on cartilaginous trabeculae. The appearance is very similar as far as the ingrowing blood vessel is concerned, as that found at the developing diaphyseal, epiphyseal junction. The cartilage cells are not arranged parallel to the long axis of the bone, but quite irregularly. Generally speaking, the cartilage cells are arranged in pairs—run at an angle to the long axis of the bone, as though they were being compressed by the bone growing in from either side.

Experiment 3R.

1. Cup-like expansions of the free ends of the bone.
2. Fibrous cartilage passing into dense mass of white fibrous tissue running longitudinally between the ends of the bone, forming a bridge.
3. Cartilage cells.
4. Spicule of bone.
5. and 6. Connective tissue forming a bridge.
7. Connective tissue envelope.

Experiment 3R—Eight Weeks—Minus Periosteum (Figure 13).

HISTOLOGIC REPORT.

The fibula at the place of fracture is greatly swollen, at least four times its average diameter. The two ends of the bone form a hollow cup, the free edges of which are composed of **cartilage** which on the side nearest the center of the callus formation is changed into white fibro-cartilage—which then becomes dense white fibrous tissue, forming the central mass lying in the cuplike expansions of the free ends of the bone. On one side of the preparation there is a plug of connective tissue running at right angles with the long axis of the bone filling in the gap between the free margins formed by the ends of the expanded bone. The whole swelling is covered by a capsule of dense white fibrous tissue (6). Lying in the dense connective tissue forming the nucleus of the callus is a large spicule of bone which is an outgrowth from one end of the newly formed bone. On one side of this spicule are some cartilage cells (3a). The newly formed bone is characterized by large haversian spaces filled with marrow containing fat cells.

Experiment 9.—Nine Weeks.—Feb. 10 1915.,
Same as previous experiment 1.
Killed April 14, 1915.
Wounds had healed primarily.
Left fibula—plus periosteum. The fracture has united with so little excess of callus that the exact location of the fracture can not be determined by the naked eye.
Right fibula—minus periosteum. There is a firm union with a great amount of callus surrounding the seat of the fracture.
N. B.—Periosteum a limiting membrane.

TRANSPLANT SERIES.

Experiment XIX.— (Figure 14.)—March 31, 1914. White female. Half inch fibula minus periosteum transplanted into medulla of tibia, same leg. Tibia had been denuded of periosteum. Platinum loop placed around tibia.
April 13. Wound healed. Killed. Specimen preserved. The gap is filled up. The X-ray shows the transplant in situ.

Histologic: Fourteen days intra-medullary transplant minus periosteum. The piece of bone which has been transplanted is **dead** judging by the **emptyness of the lacunae.** The lower surface of the transplant has been invested by the proliferating cancellous tissue which has pushed itself between the lower surfaces of the transplant and the edge of the old bone. The old

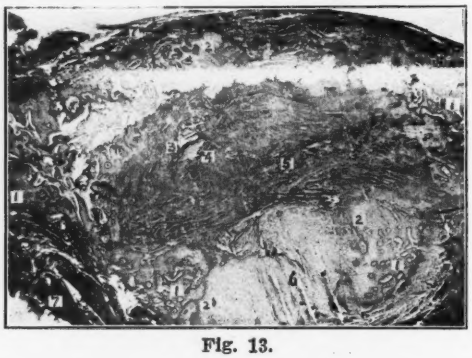

Fig. 13.

bone (shaft of recipient bone) in its outer two-thirds has made no attempt at proliferation. The upper surface of the transplant as well as the shaft of the old bone close to it have both become invested by proliferation of cancellous tissue which has grown outward and which under the enveloping connective tissue of periosteum is exceedingly active in its growth, throwing out finger-like processes.

1. Transplant.
2. Recipient shaft of tibia.
3. New bone.
4. Medullary cavity.

By the proliferation of this cancellous tissue the transplant has become firmly fixed in its position; **the transplant is playing no part in the formation of new bone.**

Experiment XVII.—Feb. 28, 1914. Male dog. One-half inch fibula minus periosteum transplanted into groove in tibia same side. Held in situ by platinum loop.

March 31, 1914. Findings—Platinum loop was found in situ. The groove in the tibia had filled up. There is a hard resistant feel over the place where the defect had been made.

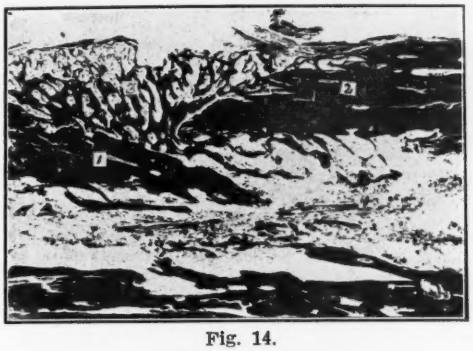

Fig. 14.

HISTOLOGIC REPORT.

Thirty-one day intra-medullary transplant minus periosteum.

Bone transplant is dead.

The cancellous tissue growing around the transplant had formed a covering to it. The growth is coming from endosteum.

1 represents dense peripheral bone.
2 represents loose cancellous bone.
3 represents loose cancellous bone.
4 represents loose cancellous trabeculae of tibia.
7 represents dense white fibrous tissue of medulla of tibia.
9 represents the remains of the fibula transplant.
10. Marrow of tissue.

Fig. 15.
1, 2, 3, 4, 5, 6. Tibia.
11. Periosteum of Tibia.

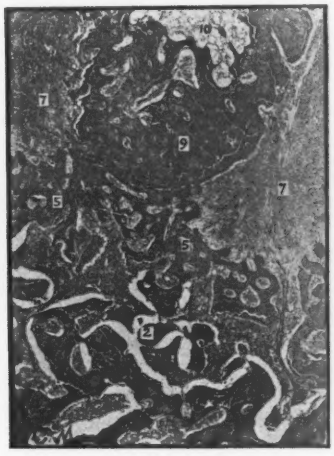

Fig. 16.
High Power of Fig. 15.

Experiment XXIX.—54 Days (Figures 15 and 16).—April 17, 1914. Young male. Exposed right fibula. Subperiosteal resection of 2½ inches fibula. Placed in saline. Exposed tibia same leg. With an electric burr the roof of the tibia for 2½ inches was removed—the medulla thus laid open. Into this groove we placed the transplant from the fibula. Tibia has been previously denuded of periosteum on its anterior aspect.

June 10. Killed. Tibia exposed found groove practically filled up. Tibia and fibula preserved in toto.

HISTOLOGIC REPORT.

September 23, 1915. Dr. Gustav Mann.

The outline of the old tibia is irregular with considerable number of osteoblasts in the subperiosteal layer. The periosteum is rich in cellular elements, relatively poor in blood vessels. The outer third of the tibia is composed of dense bone with small haversian spaces, while the inner two-thirds is cancellous and with large haversian spaces filled with marrow which is poor in fat cells. From this cancellous bone long spicules pass inward towards the region of the transplant. Notwithstanding the removal of the periosteum from the transplant a great deal of dense connective tissue is surrounding the whole of one side of the transplant in a crescentic manner, while a patch of similar tissue is found

Experiment	Duration	Age of Animal	Periosteum Plus	Periosteum Minus	FINDINGS.
15	2 days	Old	Left		Nothing except hemorrhage-broken up muscle fibres.
16	2 days	Young		Right	Hemorrhage-broken up muscle fibres and connective tissue. Considerable fibrin over the free ends of the bone. Nuclei in some of the pits on the shaft, some deep staining as if they were about to proliferate.
16	2 days	Young	Left		
11	3 days	Old		Right	Hemorrhage. Engorgement of connective tissue and muscle around bone with blood. No trace of proliferation of bone either under periosteum or in medulla.
11 13	3 days 5 days	Old	Left Left		One of the shafts shows slight **subperiosteal** bone proliferation. Hemorrhage.
13	5 days			Right	
14	6 days	Young	Left		The free ends of the shaft are polished and are covered by **necrosed** connective tissue. Very slight evidence of bone proliferation. On one of the shafts there is considerable proliferation, a make-up of long, delicate spicules of bone covered with osteoblasts running parallel to the surface of the old shaft. The **periosteum** above seems **distinct** from this new bone proliferation.
14	6 days			Right	One of the fragments of bone shows no proliferation, while on the other fragment there is an active proliferation of the surrounding connective tissue. The peripheral haversian canals are filled with cells staining more deeply than the cells in the more deeply lying haversian canals. Very slight activity of the subperiosteal osteoblasts.
7	7 days	Young		Right	Marked proliferation of osteoblasts just beneath the periosteum. Marked connective tissue hyperplasia. "The periosteum covering the newly formed spicules of bone is absolutely distinct and is not giving rise to newly formed bone corpuscles." No evidence of proliferation from the ends of the bone.
7	7 days	Young	Left		
12 2–15–14	8 days	Young	Left		The ends of the broken shaft show no evidence of repair. Marked subperiosteal formation of bony trabeculae. Evidence of transition from small cell connective tissue through fibro-cartilage to typical bone. The periosteum seems distinct from the cortical new bone formation.
9	14 days	Adult		Right	There is marked connective tissue pad covering the ends of the bone. Some proliferation of bone and cartilage on the surface of the shaft.
4 2–2–15	14 days	Young	Left		The ends of the old bone show evidence of repair springing from them. Covering the ends of the bone there is a large pad of cartilage. Under the periosteum for a good distance along the shaft there is a marked proliferation of new bone. In some fields one sees bone, cartilage and young connective tissue cells.
38	14 days	Adult		Right	The ends of the broken shaft show no evidence of repair. They are covered by a connective tissue cap. "There is a mass of cellular cartilage along the surface of one of the shafts. The marked subperiosteal proliferation seen in the above Experiment 4 is conspicuously absent as well as the pad of cartilage between the ends of the bone."
10 2–19–14	18 days	Adult	Left		The periosteum is shown as a distinct connective tissue covering. Between the ends of the bone there is a perfect pad of cartilage and closer to the shaft is well formed new bone. The proliferation seems to be growing outward.
23 3–14	27 days	Young	Left		Pad of cartilage covering fractured ends. Periosteum as connective tissue membrane is inactive. Further developments of 10L.

Experiment	Duration	Age of Animal	Periosteum Plus	Periosteum Minus	FINDINGS.
6	28 days	Adult	Left		Same as Experiment 23L.
18 2–14	38 days	Adult	Left		Inactivity of periosteum is marked. Sharp differentiation between cartilage of callus and periosteum. Osteoblasts between periosteum and bone. Callus is made up of cartilage and bony trabeculae which seem to grow from within out. See microphotographs 12, 13, 14.
18	38 days	Adult		Right	A new connective tissue envelope has replaced the periosteum which had been removed. The ends of the bone are not active, but are covered with the usual cartilage, osteoblasts and new bone formation. See microphotographs 18R (Repair of Fractures 1 to 6 weeks, S.G.O., 1915).
1 1–27–15	42 days	Young	Left		Pad of hyaline cartilage between new bony trabeculae closer to ends of the bone. Osteoblasts are present on the surface immediately under the periosteum.
1	42 days	Young		Right	Practically the same picture as on opposite side.
2	49 days	Adult	Left		There is a dense connective tissue covering of the callus. The ends of the old bone are covered by a new cancellous bone formation, between which there is a cartilage pad.
2	49 days	Adult		Right	"Complete osseous union. In the center of the callus is deposited on remnants of cartilage."
3	56 days	Adult	Left		See Protocols for particulars.

on the opposite side. This dense connective tissue is being invaded by **cancellous trabeculae from the tibia, fibrous** bundles passing into the connective tissue of the fibula analogous to Sharpey's fibres. **Remnants** of the original fibula are found in the regions corresponding to the original area of implantation. The **greater** part of the fibula has **disappeared** and the haversian systems, which have been left, are encrusted by **new** bone derived from the endosteum of the tibia. On one side of this ingrowing bone is beginning to form a layer of new bone on the inside of the dense connective tissue found in place of or on the surface of the original transplant.

The marrow of the fibula compared to the marrow of the tibia is very poor in marrow cells and is represented by an increased production of connective tissue.

Summary: It would appear that the transplant acts as a scaffolding on which new bone is deposited by the endosteum of the host; and also that the transplant disappears to a considerable extent after the lapse of two months.

Experiment XXX.—April 20, 1914. Female. Right tibia exposed. Denuded of periosteum on anterior aspect. With an electric burr the roof was removed for two inches—two inches fibula resected—lost. Radius on left side was exposed and fractured longitudinally. A portion one-half the diameter of the radius about one inch long minus periosteum was removed and placed in the groove of the tibia. Killed June 10; wounds healed by primary intention. Tibia exposed, the location of the transplant was easily found. An elevation was found which was taken to mean that the transplant healed in situ. Preserved. Radius exposed. The gap from which the transplant had been removed had filled up—in fact the new bone forms a nodular eminence on shaft of bone.

HISTOLOGIC REPORT.

September 27, 1915. Dr. Gustav Mann.

"At the site of the excavation numerous fine trabeculae are seen which toward the periphery of the bone have more or less longitudinal direction, while towards medullary, with only traces of marrow, the trabeculae are running in different directions. **There is no indication of the transplant,** the original defect into which the transplant had been placed is filled with the above mentioned trabeculae. The centers of these trabeculae, particularly near the center of the bone, have a greater affinity for methyl blue than have the more peripheral parts."

The appearance of the bone which has replaced the transplant would suggest revascularization along the shaft of the transplant. There is marked activity on the part of the endosteum evidenced by cancellous bone formation in the medullary canal.

Experiment XXI.—91 Days.—March 11, 1914. Adult bitch. Transplanted ½ inch fibula minus periosteum into medulla, tibia same side. Platinum loop.

June 10 1914. Killed. Tibia and fibula removed. Seat of transplant elevated above area of surrounding shaft. Platinum loop enclosed in new bone formation. Fibula shows no evidence of filling defects.

Platinum loop removed with great difficulty from decalcified specimen.

HISTOLOGIC REPORT.

Ninety-one day transplant minus periosteum.

Transplant gone. On side of injury to original bone there is very active thickening of cancellous nature which took place to begin with is now being remodeled to allow of longitudinal course of vessels. On the periphery the cancellous bone has become condensed to form a new

subperiosteal or peripheral lamellae; for which reason there is a layer of dense bone on the surface with much looser bone beneath, the trabeculae of which run longitudinally beneath the dense bone. The probable function of the transplant being to direct the trabeculae of the newly formed bone in a longitudinal direction. The blood vessels are very large.

Experiment XV.—Feb. 23, 1914. Young dog. Half an inch of fibula was transplanted into gutter in tibia.

March 23. Killed. Slight infection. **Bone transplant was found in situ, but not adherent to the tibia.**

FRACTURE AND INTRA-MEDULLARY TRANSPLANT SERIES.

Experiment XXXIV. April 27, 1914. Young bitch.

Exposed right radius, removed periosteum from anterior aspect of shaft for more than one inch. With an electric burr I removed the roof, thus opening the medulla. With a pair of bone-filling forceps the radius was fractured in the middle of the tunneled area. We next exposed the right fibula and resected one inch subperfosteally. The resected portion was then transplanted into groove made in radius as an intra-medullary splint.

Died May 17. **Examination after death showed a small sinus over the radial transplant.** Wound of hind leg healed primarily. **After dissection we found the transplant from the fibula in situ in the medulla of the radius. No callus had formed. The fibula transplant had not become adherent to radius at all.**

Experiment XLI.—June 5, 1914. Adult male dog.

Exposed ulna. Removed periosteum from anterior aspect. With an electric burr we opened the medulla for about one inch, reamed out the upper and lower portions of the canal, then exposed fibula. Denuded the fragment of periosteum and fibula into gutter in ulna.

Killed September 1, 1914. Wound of hind leg healed (primary union). Wound of front leg: There is a **small granuloma at the upper aspect of the wound.** When exposed the **transplanted portion of the fibula was found enclosed in a thick rind.** The transplant was not adherent to the ulna.

N. B.—We are indebted to Drs. Chillingworth, Henrigues, Lanford, Gelpi and Mr. Bertie Bayford for assistance in this work.

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THE POST-HOSPITAL CARE OF A SURGICAL PATIENT.*

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The treatment of a surgical patient may naturally be divided into three stages; first, preparatory treatment; second, post-operative treatment; and third, post-hospital treatment. Much has been written with reference to the first and second, but practically nothing about the third.

The object of this paper is to impress the importance of post-hospital treatment, to explain the reasons for its neglect, to point out the difficulties of its satisfactory accomplishment, to ask the co-operation of the profession in correcting existing conditions, and to propose a plan which, while admittedly imperfect, may prove suggestive and ultimately lead to the adoption of standardized methods.

The importance of post-hospital treatment will only be fully appreciated when it is frankly admitted that a surgical operation never cures a patient. All an operation can do is to correct an abnormal condition and put the patient in a position to get well by what the older writers were pleased to call the "vis medicatrix naturæ."

The first effect of an operation is often injurious and the beneficial results are only experienced after the system recovers from the shock and readjusts itself to new conditions. It sometimes takes weeks or months, or even years, for this to be accomplished.

A patient should be taught that the operation is not everything and that the after treatment is often of equal importance. He should be impressed with the fact that he is not well because his wound has healed, and that he should remain in the hospital until he has regained to a certain extent his physical strength and nervous equilibrium, and after he returns home for a time he should lead a life of prudence and restraint.

Patients are not machines and surgeons are not mechanics. An automobile after it leaves the shop should run, but a patient after he leaves the hospital should rest.

Who should be responsible for the care of the patient during this period? Should he be left to his own discretion? Should the surgeon lay down rules for his guidance and keep in touch with his progress by correspondence, or should the family physician assume charge of the case and direct his treatment and control his actions?

I will try to show that none of these three plans will prove satisfactory, and that the best results can only be obtained by an intelligent and systematic co-operation between the patient, the surgeon, and the family physician.

The patient can not be trusted to safeguard his own interest. The knowledge of the laity on medical subjects often seems to be in inverse proportion to its intelligence and common sense in every-day matters. If a man enters a hospital and has his leg amputated he may know that when he gets out he must use a crutch or artificial limb, but if he has his appendix removed he is apt to think he has gotten rid of a useless organ and that it is an occasion to be celebrated with his friends. A mechanical engineer will often disregard every factor of safety after a recent operation for hernia, and a policeman will sometimes forsake his beat and for six months coddle a trifling wound of the scalp.

The surgeon can not be relied on to direct the patient's post-hospital treatment. If he is a busy man his mind and time are too much occupied with new cases to give the necessary attention to the details of the after treatment of a patient who is about to leave the hospital. If such were not the case it is impossible for him to foresee all complications that may arise and to provide against them. Subsequent correspondence is unsatisfactory because a patient usually fails to give important facts, and often either exaggerates or underestimates his symptoms. Even if the surgeon prescribes correctly, his advice does little good, because it lacks the personal element of suggestion that is so essential to make it effective.

The family physician, unaided, can not be relied on to assume charge of the case. The patient frequently does not consult him promptly after his return home. He

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has often been unduly impressed with the efficiency of hospital methods and tends to look back to the surgeon rather than forward to his physician for future guidance. He writes a letter to the surgeon and gets a reply which is unsatisfactory.

The self-respecting physician naturally hesitates to volunteer his services to the patient. His mind is a little obscure as to the tie between the patient and himself. He sent the man to the hospital and is disappointed that he has not been relieved of his symptoms. He feels a little hurt at the lack of recognition of himself in the correspondence between the patient and the surgeon, and when he is finally consulted by the patient he has to an extent lost interest in the case.

The physician may be a man of large and long general practice which qualifies him to speak with authority on questions pertaining to pneumonia, malaria, typhoid fever, obstetrics, diseases of children, general sanitation, and kindred subjects, but when he attempts to direct the post-hospital treatment of a surgical patient he finds himself confronted by problems out of his usual line of study or experience.

The question of a proper dietary; of the best method of regulating the bowels; of treating bladder irritability; of the number of hours of sleep; of the necessary periods of rest during the day; of the amount of exercise that is permissible; whether steps are injurious; how soon the sewing machine may be employed; when house work may be taken up; the question of driving, riding horseback, dancing, swimming and athletic contests; the sort of clothing to be worn; whether corsets are injurious or an abdominal binder necessary; the question of prudence at menstrual periods and the relief of pain often experienced at that time; the treatment of headache; the administration of tonics, nervines and hypnotics; the use of baths, massage, and electricity; the protection of wounds; the employment of douches; the use of tampons; the period at which sexual relations may be resumed; these and a hundred other questions tax his patience, his knowledge, and his common sense.

Fortunately in the post-hospital management of a surgical patient there is no conflict of interest. The surgeon's interest, the physician's interest and the patient's interest are all bound up and centered in the patient's welfare. The fault of the present system, or rather lack of system, is in presuming too much on what the patient knows, and in dividing responsibility between the surgeon and the physician. It is the old trouble of everybody's business and nobody's business.

The surgeon knows the facts about the patient, but the physician knows the patient himself. The surgeon has special knowledge of the details of the treatment of a convalescent, but the physician, by virtue of his contact with the patient, is the only one who can apply the knowledge to the individual case.

The logical deduction from what has been said is that in post-hospital treatment the patient needs education, the physician information, and the surgeon elimination. The surgeon must be the active agent in accomplishing all three. He should utilize his influence and opportunity while the patient is in the hospital to educate him as to the proper method of living after he returns home. The advice given should be brief and to the point. There is no advantage, and potential harm, in entering upon an extended discourse on anatomy and physiology. What the patient needs to know is, first, what to expect; and second, what to do. Such instructions must necessarily be given in rather general terms. They should be put in writing so as not to overtax a weak memory or poor intelligence. Finally, the patient should be told that while the operation which had been performed had satisfactorily corrected the condition which had given rise to his symptoms, he was not yet well, and that on his return home he must place his case in the hands of his family doctor, who was fully informed of all that had been done for him at the hospital and who had received suggestions as to his future treatment.

The surgeon should next discharge his obligations to the physician. He should write and give him the details of the operation performed, the history of the subsequent convalescence, enclose a copy of the instructions given the patient, and make any suggestions with reference to the future management of the case that peculiar conditions seem to make advisable.

Often in the routine examination and

treatment of a surgical patient certain coexisting but independent diseases are discovered which circumstances render it inadvisable to treat while the patient is in the hospital. For example, a patient with appendicitis may be found to have hookworm. All facts with reference to a patient possessed by the surgeon bearing on his future treatment should be communicated to the physician.

The surgeon having fulfilled his duty to the patient and to the family physician, should finally eliminate himself from the case. If he has carried out the plans outlined he has given the best advice of which he is capable, and except in unusual circumstances can add nothing of value in the treatment of the case without another examination of the patient. If correspondence becomes necessary the exchange of letters should preferably be between physician and surgeon rather than between patient and surgeon.

Theoretically, the written instructions given the patient when he leaves the hospital should be prepared for the individual case, but practically it will be found that ten or twelve stereotyped forms can be prepared and kept on hand which will cover the needs of 90% of the patients operated on in a general hospital.

Often the form will need no alteration or addition. Sometimes it will have to be revised to meet special indications, but even then it will be found to be a labor and time-saving device and result in a clearer and more comprehensive set of instructions than would be prepared without a standard to go by.

As an appendix to this paper are attached some of the forms which have been prepared for use in a private hospital. An examination of them will show that each covers either a special operation such as thyroidectomy, hysterectomy, a partial gastrectomy or a special condition such as neurasthenia, obesity, or constipation.

Often two or more forms will have to be given to the same patient. For instance, a fat, nervous woman who has been the victim of an abdominal section would get three separate forms. Some of the instructions would probably be repeated, but this will only make them more emphatic.

These forms have only recently been prepared and have not been subjected to sufficient test to show either their merits or their faults. They are submitted for the criticism and advice of other surgeons, with the hope that they may be so improved as to become standardized and generally adopted.

Form No. 1.

ABDOMINAL SECTION FOR PELVIC DISEASE.

Your wound requires no further attention. If your clothing irritates it, you may protect it with a piece of gauze or soft linen. A comfortable corset may be worn when desired.

On returning home, avoid too much company. Go to bed early and get up late. Lie down for one hour both in the morning and in the afternoon. Spend as much time out of doors as the weather permits. Avoid taking cold, especially when you first leave the steam-heated hospital. At the end of a week begin to take short walks and drives. Increase exercise gradually. Stop as soon as you feel tired. Never go until you are exhausted. Forcing yourself to do more than your strength permits will retard your recovery.

Going up or down stairs slowly and carefully will do you no harm provided you are strong enough to do so without undue fatigue. For three or four months avoid running, jumping and lifting heavy weights. Resume your household duties gradually, taking up the lighter ones first. The broom and the sewing machine are the last things to go back to.

No local treatment is necessary other than the use of a douche if indicated for comfort or cleanliness. It should be administered in the way it was given at the hospital. A good solution can be made by adding one teaspoonful of lysol to each quart of water. Tub baths are not injurious.

No unusual restrictions are necessary in the matter of diet. It should be generous and wholesome and such as will tend to restore your loss of weight and strength.

The bowels should be regulated as far as possible by natural means, such as water, food, exercise and the establishment of a regular hour of going to stool. Mild laxatives should be used when necessary.

(A) Your menstruation may be somewhat irregular and painful for a time. Keep quiet before, during and after your next two or three periods. Don't get discouraged, as it may take some time for your organs to perform their functions normally.

(B) The operation done for you will stop your menstruation. In other words, it has brought about the change of life. This has come to you sooner than to other women, but the condition is the same as if it was the result of age. There will be no more change in your feelings, appearance, or health than was the case with your mother when she went through the same period of life. For a time it is likely you may be nervous, irritable, and have sensation of heat, but this is natural.

For a time you should be under the care of your family physician. He knows all that has been done for you at the hospital and can give you the proper advice and treatment.

While at first you must be patient and prudent, must avoid excitement, worry and overwork, don't regard yourself as an invalid. You are merely a weak woman getting well. The operation has corrected your local trouble and you will soon be restored to good health. Don't talk too much about hospitals and sick people. Don't think too much about yourself.

At your operation the appendix was_____

Please report your condition by mail at the end of three months. If you are well the information will help us; if you are not well we may be able to help you.

Form No. 2.

PLASTIC WORK IN THE VAGINA.

On returning home you should consult your physician and place your case in his hands until you are well. He knows what has been done for you while at the hospital.

There was nothing in your operation to permanently impair the natural use and function of your pelvic organs, but for a short while you must be careful to avoid injury.

Nature's sign of warning is soreness. Until soreness has disappeared, prudence should be practiced, and the safest prudence is abstinence. From four to six weeks is usually necessary for the parts to return to their normal condition.

Some irregularity in menstruation may occur for a while. This should not lead to discouragement, as the trouble will almost certainly correct itself.

No local treatment is necessary further than the use of a douche when necessary for cleanliness or comfort. It should be administered in the way it was given at the hospital. A good solution can be made by adding one teaspoonful of lysol to each quart of water.

For a period of two or three months you should avoid excessive strain and fatigue. You should be prudent, especially at the menstrual periods. Avoid heavy lifting, straining, long standing, rough riding or driving, the use of the sewing machine, frequent going up and down stairs, and straining at stool.

The bowels should be regulated as far as possible by natural means, such as water, food, exercise and the establishment of a regular hour of going to stool. Mild laxatives should be used when necessary.

No unusual restrictions are necessary in the matter of diet.

You should remain quietly in the house for a week or ten days. Then begin to exercise by taking a short walk and increase the distance gradually day by day as your strength permits.

Tub baths are not injurious.

Please report your condition by mail at the end of three months. If you are well the information will help us; if you are not well we may be able to help you.

Form No. 3.

GALL-BLADDER.

Your wound has healed, but you are not yet well. You are permitted to leave the hospital, but you must be prudent and continue treatment after you get home.

It is impossible to give you directions as to the tonics, laxatives, and other medicines you may need as your condition will vary from time to time. It will therefore be necessary for you, on your return home, to place your case in the hands of your family doctor. He has been written to and told what was done to you and what was learned about you while you were at the hospital. Seek his advice when perplexed and follow the directions he will give you.

There are some general rules which should be followed by all patients who have been operated on for your trouble. These have been written out for the convenience of both your doctor and yourself.

It is not necessary for you to wear any binder, belt or special corset. You may safely take tub baths. It is important to keep your mouth in good condition. Use a tooth brush and an antiseptic mouth wash both night and morning.

For a time you should carefully regulate your diet. Avoid raw or cooked fruit; all fats and greasy fried food; all pickles, condiments and highly seasoned foods; all rich, heavy sweets. Avoid alcohol; if taken at all, light wines are preferable to beer or liquors.

Your diet should consist principally of eggs, fish, chicken, moderate amounts of red meat, well cooked vegetables, milk, buttermilk, cereals, toast and bread.

If tea and coffee are used it should be in moderation. Drink water freely, taking it preferably before breakfast, between meals and at bedtime.

Exercise regularly and as far as possible in the open air. Begin with a short walk, the distance of three or four city blocks, and increase the distance each day as you gain strength until you walk several miles.

The bowels should be regulated as far as possible by natural means, such as water, food, exercise and the establishment of a regular hour of going to stool. Mild laxatives should be used when necessary.

You may occasionally feel "bilious," have spells of indigestion or attacks of colicky pain in the upper abdomen. This is not likely due to a stone being reformed or overlooked at operation, but to the fact that the inflammation of the gall bladder or ducts has not yet subsided. Should you have the symptoms described, try to empty the stomach by drinking and ejecting warm water and the bowels by taking a soap-suds enema. Eat little or no food, but live on milk and lime water until you can consult your doctor.

Under proper treatment and in a reasonable time you should get completely and permanently well.

At your operation the appendix was_____

Please report your condition by mail at the end of three months. If you are well the information will help us; if you are not well we may be able to help you.

Form No. 4.

HYPERTHYROIDISM.

Your wound requires no further attention.

The full benefit of your operation may not be experienced at once. Your improvement should be progressive, but you can do much to get well and stay well by observing the following instructions:

It is important to avoid undue mental excitement and physical overstrain. If anything worries you, put it off. If you get tired, stop and rest.

Get an abundance of rest by going to bed early, getting up late and taking a nap in the afternoon.

Fresh air day and night is important. Sleep with the windows open. Be careful, of course, to avoid cold by being comfortably clothed or covered.

Use nothing that irritates the nervous system. Tea, coffee, alcohol and tobacco should be avoided.

Your diet should be generous and wholesome. It should be adapted to increase your weight. Eat white meat sparingly and avoid red meat entirely. Do not take beef tea or meat broths.

Live principally on milk, buttermilk, cream, butter, bread, cereals, fresh vegetables and cooked fruit. Grape juice and other drinks prepared from fruit will be found palatable and beneficial.

Drink an abundance of water. If there is any doubt as to its purity, boil it for twenty minutes and allow to cool before using. Distilled water is desirable if it can be obtained.

Take regular but moderate exercise.

The bowels should be regulated as far as possible by natural means, such as water, food, exercise and the establishment of a regular hour of going to stool. Occasionally a mild laxative may be necessary.

If in doubt about anything, consult your physician, who has been acquainted with your condition and advised as to the treatment you are desired to follow.

Please report your condition by mail at the end of three months. If you are well the information will help us; if you are not well we may be able to help you.

Form No. 5.
CONSTIPATION.

I. DIET:

In general, the diet should be coarse and bulky, containing especially the fibrous parts of vegetables.

On arising drink one or two glasses of hot or cold water.

Breakfast.—Fruit, raw or cooked, except bananas; oatmeal; cream; corn bread; Graham bread, or bran biscuits; plenty of butter; eggs, except hard boiled; molasses or honey; coffee. Milk affects individuals differently; your own experience must guide you in the use of this article.

10 a. m.—Drink two glasses of water.

Dinner.—Soup; fish, oysters; meats; chicken or turkey; any vegetables, but especially coarse vegetables, such as string beans, spinach, cauliflower, celery, lettuce, cucumbers, tomatoes, asparagus, salads with oil dressings; corn bread or Graham bread; butter; fruits; and desserts with or without cream.

4 p. m.—Drink two glasses of water.

Supper.—Breads of the kind indicated; butter; chicken; oysters; fish; eggs; molasses or honey; vegetable salads; desserts with or without cream; coffee.

On retiring, eat dried figs, prunes or dates and drink one glass of water.

II. EXERCISE:

A moderate amount of outdoor exercise should be regularly taken, but not carried to the extent of profuse perspiration.

III. LAXATIVES:

Consult your doctor. No one laxative will prove efficient indefinitely. All lose their effect and have to be changed. When it is necessary to use any, the best are compound licorice powder, cascara, senna, and mineral oil. Glycerin suppositories and soap suds enemata also have their place.

IV. HABIT:

It is far better to regulate the bowels by food, water and exercise than with medicine. But it is better to use laxatives or enemata than to fall into the habit of constipation. Have a regular time to go to the closet, and acquire the habit of having an action at this time. The habit is not formed quickly; it may take months. But once formed, it will greatly improve your health.

Form No. 6.
OBESITY.

Your wound requires no further attention.

An adominal binder should be used, both day and night. During the day a comfortable corset may be worn over the binder.

You may safely walk at once. Start with a short walk, the distance of two or three city blocks, and increase gradually.

Go slowly. At first you should be cautious, even in such matters as straining at stool, getting in and out of the bath tub, and the like. Tub baths are not, however, objectionable. For three to six months be careful about getting on and off cars, lifting weights, the use of the sewing machine, athletic sports, heavy manual work, etc.

Drugs such as thyroid extract, anti-fat cures, etc., should not be employed except under supervision of your physician. They are capable of harm unless properly controlled.

The following diet is adapted to a safe reduction in weight:

Take one pint of hot water slowly before rising or while dressing.

At the usual breakfast hour take a cup of tea, or coffee, without milk or sugar, a small mutton chop or beefsteak, or one egg, and one slice of toast.

At 2 o'clock eat all you desire of any one of the following meats and vegetables, the latter cooked without meat:

(a) Well done roast beef, steak, mutton, fowl, or raw oysters.

(b) Spinach, tomatoes, cabbage, turnip tops, celery, parsnips, apples, rhubarb.

At 6 o'clock eat one slice of well toasted bread and one poached or soft boiled egg.

At bedtime take one pint of water.

Prevent constipation by exercise, a regular habit, and mild laxatives occasionally if necessary.

Open air exercise, gradually begun and progressively increased, and a tranquil mind are most important.

Avoid carefully bread, beans, peas, potatoes, all sweets and pastry, and fluids with your meals.

Strictly followed, this regime should reduce your weight one-half a pound per day. If more

is lost, let up on the diet every fifth day, and eat moderately of fruits.

Form No. 7.

NEURASTHENIA.

Your wound has healed and requires no further attention.

The operation has removed the cause of your trouble, but it will take some time for you to get well.

When you get home you should put yourself under the care of your physician. He knows all that was done for you and all that was learned about you while you were in the hospital.

Don't continually think about yourself and ask yourself how you feel. You don't know enough to tell whether a symptom has any significance or not. You employ a doctor; let him do the worrying for you.

Don't worry yourself. Worry is thinking to no end. "Distracted" means drawn two ways. Worry and distraction prevent rest and sleep and result in chronic tiredness.

The cure for worry is concentration on something with an end in view. To be wholesome that something must be productive. In other words, you need occupation.

While at the hospital you had a "rest" cure. You now need a "work cure." Try to find some light, useful work that will occupy and interest you.

At meal times put aside care. Don't be afraid to trust your digestion. Don't abuse it, but use your stomach confidently.

Keep the bowels open by natural means such as a proper diet, an abundance of drinking water, a reasonable amount of exercise and a habit of going to stool at a regular time. Mild laxatives may be necessary occasionally.

Avoid stimulants and hypnotics unless prescribed by your physician.

On getting up in the morning take a cold sponge bath. On going to bed take a warm tub bath. Sleep with the windows open.

Rest in a quiet room for one or two hours in the afternoon.

Spend as much time in the fresh air and sunshine as your strength and the weather will permit.

Increase exercise as you gain strength, stopping when you get tired and not going until you get exhausted.

Please report your condition by mail at the end of three months. If you are well the information will help us; if you are not doing well we may be able to help you.

Form No. 8.

STOMACH—(Organic).

Your wound requires no further attention.

You do not need an abdominal binder or special type of corset.

Your diet should be carefully regulated for several months. This does not mean, however, that it should be unduly limited. On returning home, you should promptly put yourself under the care of your physician. He is fully acquainted with what has been done for you at the hospital, and can help you to get well by his advice and counsel.

You should have ample nourishment of a wholesome kind, but not large meals. Five small meals a day are better than three large meals.

Acid and highly spiced foods should be avoided. Unusually coarse food, such as celery, tough meats, stringy vegetables and the like are apt to be irritating. Milk and buttermilk are well suited to your case. A well balanced dietary of meats, fish, eggs, vegetables, bread and butter, light desserts, may be taken under the supervision of your physician.

Water should be taken freely, but not forced.

Alcohol is best avoided. If used, light wines are preferable. Beer and liquors should not be used.

Tea or coffee may be taken in moderation.

Your use of tobacco should depend somewhat on your former habit. Decrease rather than increase.

Put aside care, especially at meal time. Avoid rapid eating, and chew the food thoroughly.

Careful attention to the toilet of the mouth should be exercised. Use a tooth brush and antiseptic mouth wash both night and morning.

The bowels should be regulated as far as possible by natural means, such as a proper diet, an abundance of drinking water, sufficient exercise, and the establishment of a regular hour of going to stool. Mild laxatives should be employed when necessary.

Tub baths are not objectionable.

You may begin with a short walk immediately, the distance of two or three city blocks, and increase gradually as your strength permits.

Avoid excessive fatigue, mental strain, undue annoyance and excitement.

A sufficient amount of rest should be obtained by retiring early and lying down once or twice during the day.

You should expect to devote the next few months to measures directed to the complete restoration of your health. A gain in weight is desirable, and speaks well for your favorable progress.

At your operation the appendix was----------

Please report your condition by mail at the end of three months. If you are well the information will help us; if you are not well we may be able to help you.

Form No. 9.

STOMACH—(Reflex).

Your wound requires no further attention.

No binder or special type of corset is necessary.

Your stomach was carefully examined at operation, and showed no evidence of disease. As is often the case, the stomach symptoms were due to trouble outside the stomach, which has been corrected.

The full benefit from your operation will be experienced gradually. You should avoid starving yourself on account of stomach symptoms. Especially at meal time put aside care. Don't be afraid to trust your digestion. Don't abuse it, but use your stomach confidently.

Your diet should be generous and wholesome. Highly seasoned and greasy foods, pastries, pickles, condiments and notably indigestible articles should be avoided.

Tea and coffee should be used only in moderation.

Drinking water should be neither limited nor pushed to excess.

Your use of alcohol and tobacco should depend somewhat on your former habit. Decrease rather than increase.

If there is a tendency to constipation try to overcome it by natural means, such as water, diet, exercise and the establishment of a regular hour of going to stool. An occasional mild laxative may be necessary.

Regular exercise out-of-doors is important. Begin with a walk of three or four city blocks, and increase gradually.

Get plenty of fresh air day and night. Sleep with the windows open.

Tub baths are not injurious.

Careful attention should be paid to the toilet of the mouth.

Ample hours of sleep and rest are important until your health is completely restored. Worry, excitement, undue annoyance, over-indulgence of any kind, rapid eating and insufficient mastication of food, all should be guarded against. Avoid excessive fatigue, but don't be afraid of wholesome work increased at a moderate rate.

Your physician is fully acquainted with what has been done for you at the hospital and can advise you as to the time when you can safely resume your full duties. He can guide you along the lines of patient and persistent re-education of the stomach and other bodily functions to their normal work.

Please report your condition by mail at the end of three months. If you are well the information will help us; if you are not well we may be able to help you.

Form No. 10.

HERNIA.

Your wound requires no further attention. You do not need a truss or abdominal belt. For a while you should be prudent, but in time your ruptured side will be stronger than your good side.

You may safely begin to exercise at once. Start with a short walk, the distance of two or three city blocks, and increase gradually as you gain strength.

Going up or down stairs slowly and carefully will do you no harm provided you are strong enough to do so without undue fatigue.

At first you should be cautious even in such matters as straining at stool and other physiological acts. Be careful how you get in and out of the bath tub. Avoid jolting and driving over a rough road. Neither baths nor comfortable riding, however, are objectionable.

For three to six months be careful about getting on and off cars, lifting heavy weights, cranking automobiles, swimming, horseback riding, athletic sports, and heavy manual work.

As far as possible, keep the bowels open by natural means, such as a full generous diet, an abundance of drinking water, a moderate amount of exercise, and the establishment of a regular hour for going to stool. Mild laxatives may be necessary at times.

Put on weight if below normal by free diet, fresh air and plenty of sleep.

At the end of a month or six weeks, you may safely begin any light work.

This is simply a guide and intended to be suggestive. You can apply the same principles to the many things that will come up and cannot be foreseen. If in doubt, consult your physician. He is fully acquainted with what has been done for you at the hospital and with all the essential facts bearing on your case.

Please report your condition by mail at the end of three months. If you are well the information will help us; if you are not well we may be able to help you.

Form No. 11.

HIGH BLOOD PRESSURE.

Your wound has healed and needs no further attention. From a surgical standpoint you are well. From a medical standpoint you still need observation and treatment.

Your watchword should be "Moderation." This is not because you are an invalid, but to avoid becoming one.

Go slowly. Moderation will serve you in the wear and tear of life like oil to a good machine.

Work easily; exercise lightly.

Shortness of breath is a signal to slow down.

Be temperate in all indulgences.

Avoid excitement; cut out worry.

Eat sparingly — finish a little hungry rather than replete. Better five small meals than three large ones. Take meat not more than once a day, and sparingly then. No meat extracts. Limit salt. Highly seasoned foods are not desirable. Vegetables, fruits, bread, cereals and milk should constitute your staple diet. Tea and coffee should be used moderately if at all. Your use of alcohol and tobacco should depend somewhat on your former habit. Decrease rather than increase. Drinking water should be neither limited nor forced.

Keep the bowels open. Epsom or Carlsbad salts once or twice a week, if necessary, to make them a little free.

Secure ample rest. Retire early and sleep late. Be a little lazy.

Exercise regularly, but not violently. Avoid straining at stool. Cold baths had better not be used. Warm or tepid water is preferable. Turkish baths should not be taken without the advice of your physician. He is fully acquainted with what has been done for you and what has been learned about you while at the hospital. You should consult him at reasonable intervals.

Many men and women have done the best work of their lives working under similar limitations.

Please report your condition by mail at the end of three months. If you are well the information will help us; if you are not well we may be able to help you.

Form No. 12.

HEMORRHOIDS.

It probably will be several weeks before you are entirely well.

Begin to exercise gradually. Avoid straining, heavy lifting and violent exertion.

Don't sit on pillows or cushions. Use a cane

seated chair that permits free circulation of air.

Cleanliness is essential. Take a tub bath daily and protect the parts from contact with clothing by wearing a pad of dry gauze.

If the parts itch or feel dry and hot use some mild ointment like vaseline.

If from any cause they become swollen and painful keep very quiet and apply a pad wet with a solution made by dissolving one drachm of chloral hydrate in two quarts of water.

For the first few weeks you should have two or three stools each day and the movements should be soft and without strain. Later you should have a regular hour of going to the closet and establish a habit of having a stool at that time.

The bowels should be regulated as far as possible by natural means, such as drinking an abundance of water, especially before breakfast, and by eating the proper sort of food. Figs, prunes or dates at bed time will often do away with the need for medicine.

If a laxative is found necessary consult your doctor. No single preparation will prove efficient indefinitely. All lose their effect and have to be changed. The best are cascara, senna, compound licorice powder, and a good brand of mineral oil.

Glycerine suppositories and soap suds enemata also have their places.

For a time after the operation you may be annoyed by tits or tags of skin around the anus. These will almost certainly disappear.

Please report your condition by mail at the end of three months. If you are well the information will help us; if you are not well we may be able to help you.

DISCUSSION.

Dr. W. W. Grant, Denver, Colo.—I have no hesitation in endorsing prompty and unequivocally the policy of giving the patients, and their family physicians, explicit instructions as to the post-operative treatment. This should be considered in two stages: The immediate and the more remote after-treatment upon which Dr. McGuire has so ably dwelt.

The subject is a timely one, because very much neglected by surgeons and physicians, and about which so many patients are ignorant, if not, even, indifferent.

The way to prevent a lot of trouble is to operate upon patients at the proper time. Preparation of a patient, properly, for a surgical operation seems a lost art at the present time. The first important personage to consider after operation is the nurse. The immediate after treatment is committed to her and she is what the surgeon makes her.

A recovery room is needed in every hospital. The nurse usually wraps the patient in blankets, which give a sweat bath, even if in shock. This can only result in increasing the shock and delaying reaction. The practice is reprehensible and surgeons are responsible for it.

After a severe operation no patient should, drunk with delirium, be immediately placed among other patients, and yet it is a common occurrence in hospitals.

I do not object at any time to the family physician attending the patient in a hospital with the surgeon, but the motive and compensation should be above criticism. The family physician should be present when practicable, because of his knowledge of the patient and his relation to, and interest in, the patient, and not because of any mere commercial consideration. If the family physician and surgeon will work together, under these conditions, I have no doubt that it is infinitely better that the family physician should take partial charge, at least, of the patient afterward, but morally and legally the surgeon is responsible, and his supervision is absolutely necessary until the patient leaves the hospital.

I have never had much respect for the advice of surgeons who tell their patients, after an abdominal operation, for instance, that they can be out of bed and walking about in a few days or a week. The conscientious surgeon well knows that rest is beneficial to patients after severe operations, and they should not be up in a week. Most patients leave the hospital too soon. When they depart they should be in charge of the family physician, for often it is weeks and months before they are well enough to dispense with his service.

As to neurasthenic patients of which he speaks: My rule is to operate upon them only when it is an absolute necessity. The surgeon who operates upon these neurasthenic cases, in the absence of positive pathology, is making trouble for himself.

No class of cases is so unsatisfactory, as a rule, to both patient and surgeon. General rules can not be formulated for the post-operative treatment, either while in or after leaving the hospital. Special instructions for each class of patients may be feasible. The extent of such instructions for patients is a debatable question. I doubt if it is good policy to give patients unnecessary information, or to burden them with advice as to their ills and their welfare. But the plan of instruction to which Dr. McGuire has evidently given much thought and which he has so well outlined in his paper, the details of which can only be worked out by experience, should receive the earnest consideration and approval of the profession.

Dr. Denegre Martin, New Orleans, La.—We have all enjoyed this paper very much, and I consider one phase of it a very important thing: the neglect of these cases—the after treatment—so many of them. I have had patients say: "I have neglected this operation and have postponed it, because Mrs. So and So was operated upon and never relieved." The fact was due to the cause of the neglect of the after-treatment. These conditions we see often, and I can say from a personal experience that I do not believe that any patient who has had an operation of any magnitude at all recovers within a year from that time. They recover, apparently, yes; they may look well and feel well, but there is a condition that takes time to obliterate.

This paper has given me a great many ideas that I propose to carry out, and especially the written instructions. It has been our habit, for a long time, to consult the family physician. With many of our country people it is impossible to carry out these instructions, and many of our people could not carry out any instructions at all unless you stay right by them and make them do it, but even the intelligent sometimes have a

hard time to carry out some of these instructions. They feel well and do not realize the importance of carrying them out, and yet they have to pay for it in after time. It is only when these cases come back to us with after-pains and after-treatment that if we inquire carefully into the history we will find that there is some cause, possibly, for the condition other than that of the operation; and if I can do nothing more than emphasize the importance of this, and especially the point that if the family physician will only take the proper interest in this case and not believe that as soon as he has turned it over to the surgeon he should wash his hands of it; he should do everything to assist these patients in getting on their feet.

Dr. Guy L. Hunner, Baltimore, Md.—We hear many women say: "I have deferred operation because you operated upon Mrs. Jones four months ago and she seems to be worse than when she was operated upon." I think it might be well in a series of instructions such as Dr. McGuire has printed to make the definite statement that "You will probably not be entirely recovered inside of twelve or eighteen months, but you will continue to grow better all the time." Then the patient will know definitely about how long she has to wait for recovery. They do get discouraged after a few months when they find they are still unable to manage the ordinary duties of life with zest and energy.

Dr. C. M. Rosser, Dallas, Texas.—A thing which I am very fond of saying to our students is that the view of surgeons must distinctly change. I think it has changed, for the better and more thoughtful men, already. We talk too much about the mortality rate. Years ago it was all we heard. The statistics regarding surgical work were about mortality. I think the man who discusses mortality only, the patient, upon the termination of his stay in the hospital, congratulates himself upon escaping from the surgeon.

I think no operation should be performed unless there is a possibility of relief from the conditions existing. We should get away from the idea that the diagnosis is to be operated upon. Let it be the patient, for what he has, and not for what he is supposed to have. It does not matter at all whether it is because the diagnosis is made by some one else or by himself, the last opportunity which the patient has is in the hands of the surgeon, determining what should be done, ceasing to do when the moment comes to stop. Very few people know when to quit. We must get away from spectacular work. Some years ago it was the idea to let some one stand by with a watch to see how long it would take to do a thing; then a well organized hospital would have a publicity works (not necessarily a paid advertisement in a newspaper), to tell just how long it took to do things. I am pleading now for the rights of the patient to be operated upon for what he requires. The patient should have every moment of the surgeon's time that he needs, independent of who is to follow or what is to be done. I think that the end results are the things that should be thought about rather than mortality.

A patient comes in suffering with some ovarian trouble and you operate upon it without due care, and she gets adhesions and pains that hurt her every day in the month.

That operation should not be done which is not needed; care should be taken that the work should be done only with the patient's interest at stake, and the end results from the standpoint of the patient always, rather than the numbers that are to be operated upon or spectacular surgery.

Dr. Thompson, Galveston, Texas.—Dr. McGuire has been kind enough to ask the section of surgery to discuss his paper freely and to criticise it thoroughly. I am in thorough accord with Dr. McGuire's views and have listened to his paper with a great deal of pleasure. It is one of the most unique experiences that has happened to me in many years. The paper is so out of the ordinary and deals with such important facts that it will give all of us food for thought for a long time.

It is the experience of every surgeon to have cases consulting him on whom an operation has been performed at some previous time, who are absolutely ignorant as to the nature of the operation and as to what organs have been removed or interfered with. If, say, an operation has been performed in the lower abdominal region, they do not know whether one or both ovaries have been removed. They know nothing about the condition of the tubes, nor are they able to tell you definitely whether the appendix has been removed or not. These cases are extremely difficult to deal with. They constitute the flotsam and jetsam of ordinary surgical practice and the condition of many of them is truly deplorable.

In a large number of cases, it is quite impossible to find out the physical condition of these patients, because letters addressed to the surgeons who have operated upon them are not answered. Along this line I will suggest that it would be a proper thing to give each patient a concise account of the operation that has been performed upon them, and to explain in a definite way, what has been done so that if the patient consults a doctor at any subsequent time, he may know accurately the anatomical status of his patient, as to whether one or both ovaries are present, etc., etc.

Dr. Southgate Leigh, Norfolk, Va.—This is a matter in which I have always felt a deep interest; so much so, that I have read a paper very much along the same lines a year ago. There is no doubt that it will be to our advantage, in some ways, to furnish the patients with these instructions. But, gentlemen, I want to sound a note of warning: The time is coming when the surgeon and the general practitioner have got to get closer together. (Applause.) And this is not the way to bring them together. The surgeon has got to do everything possible to uphold the family physician. He has got to do everything possible to increase the confidence of the patient in the family physician. If he does not, he is not going to get the co-operation that is necessary. We ought to get the assistance of the family physician more and more in making our diagnosis, in getting our correct histories; and the ideal thing is that when our patients leave the hospital, when the treatment is only just begun, that that patient ought to be confided,

fully and entirely, to the hands of the family physician, if he is competent. (Applause.)

Dr. John T. Moore, Houston, Texas.—I am very much pleased, indeed, to have heard this paper. There is one difficulty that may arise in furnishing the patient with these instructions—a less intimate relationship between the family doctor and the surgeon who does the operation. That is a very important point and the one that I desire to discuss.

In giving this information and instruction to the patient directly, I feel that it would not accomplish the same end as to give them directly to the family physician, who will then communicate them to the patient, and in that way there will be a closer established working basis. Now, I frequently find that when you give definite instructions to your patient about what he or she shall do that the patient goes home and it upsets the family doctor entirely, because the surgeon's views do not always coincide with the doctor's views. Now, the family doctor is the one that is to take care of the patient, and the doctor ought to understand something about what the surgeon has done, why he has carried out a certain program, so that the family physician and the surgeon may harmonize their views and carry out a general working plan of getting the patient well.

I doubt whether it would be wise to label these instructions with any particular disease. These might be numbered and the surgeon and the doctor understand about what is to be given to the patient, according to certain operations, but I think it is a very dangerous thing to burden patients always with all of the work that has been done; that the patient ought to know the essential things in every operation—what organs have been removed—but I do not think it well to tell them too much about the details of the operative procedure, and I presume it is not Dr. McGuire's plan to do that.

I think that this is a very important thing and will be a great help in establishing a closer relationship between the surgeon and the physician. I think the plan in general an excellent one.

A Member.—One point: The frequency of sending the patients home, or back to the family physician, on the seventh, eighth or ninth day after an abdominal section. We have not allowed that patient to fairly convalesce; we have not allowed him to become in a condition where we know what diet is going to agree with him, whether we are going to have phlebitis flare up, as I have seen occur.

I would like to condemn the habit of sending these patients back to the family physician at such an early date that we are not positive complications are not going to occur, and with which the surgeon is more familiar than the family physician.

Dr. Millikin, Dallas, Texas.—Dr. Thompson sounded a very important note, I think, in ascertaining, if possible, what has been done for patients, be it the family physician or the subsequent surgeon who falls heir to the patient.

I had occasion to look up with the late Dr. Bull, of New York, a series of cases, and in that day hospitals, as well as individuals, did not keep the records of their cases, and I have had only recently an opportunity of looking over the records of Dr. Cateman, of Boston, who is doing a very unique work, and the stress that is laid down is not why and for what you are going to operate, but following it and giving the end results and following it by the family physician. We must follow our cases and have a definite knowledge of what we have done before we can tell the patient what to do. I think that many times our patients go away under the impression, as Dr. McGuire has so wisely said, that they are well, and in too short a time; and I do not think that the paper has emphasized too strongly the point of following the details of the cases.

Dr. McGuire Closes.—As the hour is late, I will speak very briefly. No one has a greater respect of the family doctor than I have. I would not hurt his feelings for the world. I depend on him for my living. I think any one who will carefully read my paper will find that I have safeguarded his interest. The directions given the patient are with reference to his habits of life and no suggestions are made with reference to medical treatment. He has been told to place his case in the hands of his doctor and to apply to him for tonics, hypnotics, laxatives and other treatment he may need. If any member of this section is interested in the matter and would like to have a copy of the various forms I have prepared to be used in special groups of patients I will be glad to send them to him if he will drop me a postal to Richmond giving his name and address. If, after reading them or using them, any suggestions occur which will help to perfect them, I will appreciate criticisms.

FISTULA-IN-ANO IN A CHILD.

By S. L. Boccellato, M.D.
Memphis, Tenn.

I wish to report a case that I have found unmentioned in the literature so far. The only point of interest in this case is the age of the patient. The case is only one of a child five months old with a blind external fistula-in-ano, the opening of which is on the right side just a half inch from the anal orifice.

Tuttle in his book reports the following: Age. Fistula may occur at any period from birth to very old age, but it is essentially a disease of middle life. Quenu and Greffrath state that in 147 cases only four occurred under the age of eleven years. These figures should not be taken as conclusive as regards the disease in children. The institutions from which these authors obtained their statistics are not hospitals for children; in fact, children compose a very small proportion of the patients in either institution, and therefore the facts do not properly represent the proportion of fistulas in infants. Deran-Borda (These de Paris, 1882, No. 233) and E. Vigne (These de Paris, 1882, No. 187) have gone into this subject thoroughly, and show that their occurrence in children is considerably more frequent than is ordinarily admitted by surgeons to general hospitals. At the Polyclinic Hospital six cases of fistula were treated in children under five years of age during the past five years. The earliest at which it has been seen was one and a half years.

RAILWAY SURGERY

MOVABLE KIDNEY — ITS MEDICO-LEGAL SIGNIFICANCE.*

By Walter W. Crawford,
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Hattiesburg, Miss.

An investigation of the literature of movable kidney impresses one with the fact that although a large number of surgeons have edified the profession with essays on the subject, very few have elaborated it from the standpoint of trauma.

When one recalls the fact that a vast majority of the cases of so-called traumatic displacement sooner or later, and usually sooner, become matters of court record, one must be convinced of the importance of being able to differentiate this condition from the usual sources of this defect.

What part, if any, does trauma play in these cases? Kelly, in summing up a rather exhaustive discussion of the etiology, says: "Movable kidney then seems to depend upon a number of predisposing and active causes. The predisposing causes are especially body form and laxness of the supporting structures of the kidney. The active causes are various acute and chronic traumata."

Ransahoff thinks trauma is frequently the cause of movable kidney.

On the other hand Guiteras says: "I feel that the claims that sudden traumatism causes movable kidney—such as blows on the loins, a fall on the knees, buttocks or perineum, a blow on the thorax, a sudden muscular strain due to the abrupt stopping of a car and other claims of a similar nature that are used in suing corporations and railway companies—are groundless. In all such cases, if the traumatism had been sufficient to displace the kidney suddenly, it would have been grave enough to have ruptured the vessels or the renal pedicle and given rise to a dangerous hemorrhage, and perhaps sudden death." He says further: "I believe that persons who suddenly complain of pain in the loin after shock, a car accident or jar, and in whom a movable kidney is found on examination, would have shown the presence of such a condition had they been examined before the accident; but as there was no reason for such an examination the presence of movable kidney was naturally not known. On the other hand, when a movable kidney exists, a sudden jar or wrench may give rise to renal strangulation and thus bring on symptoms that might induce one to believe that the mobility had been caused by the recent traumatism."

Our problem, of course, is to determine whether a given case with a history of possible injury has been the victim of an acute displacement or belongs to the 25% or 30% class of women who are found under routine examination to have movable kidney.

The following case is one of many that might be related as indicating that violent traumatism does not readily produce displacement:

C, a brakeman, fell from the top of a box car. He struck the iron rails over the region of the right kidney. There was an abundance of blood in his urine for several days. He developed several degrees of fever and some manifestation of sepsis. Recovery after a number of weeks of illness. No displacement. Diagnosis ruptured kidney.

It is not our purpose to amplify the various etiologic factors in the production of this condition, but briefly stated it is our conviction that the two chief factors are peculiar body form and the absence of peri renal fat.

Wolkow and Delitzen, from cadaver studies, first called attention to the two para vertebral niches that, under ordinary conditions, provide a resting place for the kidneys. (Kelly Diseases of the Kidney, p. 474.)

This niche is not always of proper size and abnormality in this respect is a factor in displacements.

Becher and Lenhoff, after making numerous investigations, made a deduction that is regarded by many authorities as

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being an accurate formula for determining by measurement the probable existence of movable kidney in any given case.

The distance from the sternum to the pubis is divided by the shortest circumference of the body and multiplied by 100. If the result is seventy-five or less the patient will be found to have normally placed kidneys. If greater than seventy-five, the existence of movable kidney can usually be verified.

In the judgment of the essayist the scarcity of peri renal fat is the most prolific source of displacements.

Most of the cases of displacement are seen among women who are thin. Occasionally women of this type increase in weight as much as twenty or thirty pounds, and when they do their kidney symptoms not only improve, but in many instances the mobility entirely disappears. A patient came to us last week for gynecological treatment who had such a pronounced displacement of the kidney three years ago that her physician had urged her to have it anchored. Later she gained about twenty-five pounds and at present the kidney is free from symptoms and is not movable.

The findings of Blum (Kelly, p. 468) that the kidney was movable in thirty-seven out of one hundred and six chlorotic and poorly nourished children stresses the significance of peri renal fat as the important factor in fixing the kidney. Marked relaxation and the absence of fat in these children allows a ptosis that in later years may become so pronounced that it may be and no doubt often is interpreted as a congenital condition.

If traumatism is responsible for any given case of mobility there should be history of great pain in lumbar region and nausea immediately following the injury. A few hours later there should be blood in the urine and extreme tenderness over loin, and the kidney should be distinctly movable. Even though the patient complained of tenderness over loin and the kidney was movable, it would lose its significance unless at least a small amount of blood is found in the urine.

Care should be taken that a catheterized specimen is examined before the kidney is manipulated, as the mild traumatism incident to palpation may develop a trace of blood.

The psychic element is a conspicuous factor in many of the cases where trauma is to be reckoned with. If it so happens that a patient who has participated in a wreck or had a narrow escape from serious injury has a previously undiscovered movable kidney, or if she is made to believe that she has one, she can be readily convinced that the situation is serious. She may not wish to exaggerate her symptoms, but as she gets further away from the time of the accident the possibilities become larger and she is wont to believe that a life of hopeless invalidism confronts her. If she has a husband who is of the Wallingford type he sees to it that her imagination is abundantly supplied with the pabulum best suited to his designs.

I recall a case of this type. The patient, a rather fleshy woman, was supposed to have had a dislocated kidney from a railroad accident. One physician thought he found distinct mobility in the kidney; two others were equally positive that the condition did not exist.

The analysis of such a case suggests the very pertinent question, Do fat women have movable kidney?

In our experience, with a reasonably large gynecological practice, covering a period of seventeen years, we do not recall having seen a single case of movable kidney in a woman weighing more than one hundred and fifty pounds. We do not think the condition can be produced by trauma in that type of women. If a positive diagnosis is established in a corpulent woman, we believe the history will show that at some time during her life she has been thin either from natural causes or from some illness like typhoid, and that the mobility was developed then.

Movable kidney must be differentiated from ptosis of the liver, enlarged gall bladder, enlarged head of pancreas, from tumors of the intestine and especially the cecum, and last from hydronephrosis.

Ptosis of the liver frequently imparts the same sensation to the examining finger as the kidney, but is larger and is not so easily displaced upward.

In one of our cases the gall bladder was enlarged until it reached McBurney's point. It did not have the consistency of the kidney nor did it have the gliding motion that characterizes movable kidney.

Enlargement of the head of the pancreas has the history of an associated jaundice and lacks mobility.

Tumors, especially of the cecum, will not recede into the kidney space and do not have the pyriform shape of the kidney.

Hydronephrosis is usually intermittent in character and has a history of occasional polyuria.

In palpating the kidney one is often able to locate it by having the patient lie on the side opposite the suspected displacement, even though he may have failed with the patient on her back or standing.

Radiographic study may clarify the situation in cases of doubtful diagnosis. Before the solution is injected into the pelvis of the kidney it is important that the patient take a number of deep inspirations while standing and that the abdomen be not disturbed by palpation. The renal pelvis is then filled with a collargol solution. By this method the position of the kidney, as well as the contents of its pelvis, is determined.

Eisendrath and Keyes have both shown that the only danger attending the use of collargol solution lies in the over-distension of the pelvis or retention of the fluid for too long a period.

Luckett and Friedman, in Annals of Surgery in 1914, stress the advantage of pyelography in diagnosis of ruptured kidney either associated with or independent of displacements. They showed that the fluid distributed itself in the lines of broken continuity and thus provided a bird's-eye view of the damage done to the organ.

Only a small percentage of movable kidneys produce symptoms and require any treatment. Of the number who require attention many are made quite comfortable with some sort of mechanical support.

The writer's father, who is a very frail man of seventy, has had a second degree prolapse of the kidney for a great many years. Occasionally it is the source of some discomfort. He then adjusts a simple pad that he has found more practical than those manufactured and wears it for a month or two, after which he is free from symptoms for a year or two.

If a movable kidney is the source of almost constant pain and tenderness and is not relieved by the application of a bandage, the case should be given surgical attention. If not, the kidney will become definitely pathological and may finally, as a result of the persistent traumatism incident to its mobility, develop a chronic nephritis. Dieulafoy says in this connection that 14% of the cases of movable kidney have albuminuria.

We have found small islands of degeneration in a number of the cases upon which we have operated. All of them, however, have been completely relieved by the operation.

Movable kidney in a reasonably large number of cases is associated with a general visceroptosis, and under those circumstances its surgical treatment is not attended with good results.

Since Kahn in 1881 anchored the first kidney there has developed a wide variation of technique.

Our first operation, performed in 1901, was after the plan then followed by Goelet. The kidney was drawn up to the edges of the wound and two silk worm gut sutures were passed through the cortical substance at a distance of about one inch apart. They penetrated to the depth of one-quarter inch or more and were brought out about one inch from the point of entrance. These sutures passed through muscle and skin and were made secure. In some instances they were tied over a piece of gauze. The doctor might not recognize this description of his method, but this is the way we did the work. Patients were kept absolutely on the back for two weeks and were allowed out of bed four weeks after the operation. Sutures were removed in two weeks.

We have long since discarded this method, but wish to say in its defense that our end results were uniformly good.

For the past ten years we have utilized the partial decapsulation method with very excellent results. The kidney is delivered upon the back and a three-quarter and sometimes complete decapsulation is done. Four chromicised cat gut sutures are used to attach the capsule to the muscles of the back. The redundant part of fatty capsule is sutured in the lower angle of the wound so as to form a cushion for the kidney, and later, when the fibrous tissue incident to repair has developed, this soft, resistant cushion effectually

blocks any tendency the kidney might have to descend. No drainage is necessary.

The distinct advantages of the decapsulation method are:

1. It improves the condition of the kidney itself

(a) By relieving the tension of capsule on a kidney that is usually swollen; and

(b) Increasing the circulation of the kidney. This latter is accomplished by the formation of new blood vessels, forming a direct communication between the new bed and the kidney substance. This new circulation, we believe, is responsible for the disappearance of the pathology within the kidney, and certainly has more to do with the merits of decapsulation in Bright's disease than the mere relief of tension.

Patients who have had this operation should be cautioned not to expect a maximum of result for several months after the work has been done.

DISCUSSION.

Dr. T. H. Hancock, the President.—Gentlemen, you have heard this most excellent paper of Dr. Crawford's on a subject which has interested all of us. All of us who have done railway surgery, I suppose, have had to defend damage suits on account of floating kidney. The discussion is now in order.

Dr. Chas. C. Sims, Moorings Port, La.—In the complications I did not hear the doctor mention wandering spleen as one of the complicating organs that we often come in contact with.

In my surgical work I had once an abdominal tumor that none of us could make out, and we found it to be the spleen, with a long pedicle to it, way down in the lower abdomen; so it is well to remember that the spleen is one of the complicating tumors where floating kidney is found, sometimes.

Dr. Frank L. Watson, McAlester, Okla.—The doctor brought out very nicely the features of a traumatic kidney, stating that in the event of a movable or floating kidney that we would have hemorrhage, etc., which, on a moment's reflection, is apparent to us all.

One feature of diagnosis (I do not know whether it is mentioned by the text-books on diagnosis or not), but following an injury, where floating kidney is suspected, I have discovered on two occasions that, on examining the patients in the recumbent position, the hand placed on the right or left umbilical region, the patient is asked to sit up upon the table, if you just raise him up in a sitting position, when the kidney falls from its location, that it seeks in the recumbent position, that it assumes in its floating position, when the patient is upright you get the sensation of ballottement.

He said the convalescence was slow following his operations for fixation of the kidney. An instance occurred in 1914 on the Rock Island railroad. The peculiar part of it was that both the patients were Indians. One occurred one morning, the other on the succeeding morning, each injury inflicted by the train of the same number. In each instance it was a left kidney that was nephrectomized. The Indians had been imbibing too freely, and following injury they were brought to the hospital. The first one had the kidney completely macerated; nothing left of it. It did not injure the renal vessels, so we ligated them and closed the wound with drainage, and his convalescence was undisturbed.

The second one, who, on the succeeding morning, also had the left kidney eneucleated and damaged in the lower part, only had a nephrectomy completed for him, and he, in contradistinction to the other one, had a stormy convalescence, showing that he must not have had a normal functionation of the opposite kidney, and he had all of the attendant sequelae that we have seen where a kidney has been removed without first testing the functioning power of the opposite kidney.

These are actual conditions. Any of us might tomorrow, come in contact with a condition of that kind, and it gives to you the actual experience of two cases occurring close together where one was absolutely uninterrupted in its recovery and the other one was attended with all the dangerous sequelae concomitant with traumatic nephrectomy.

Dr. J. A. Crisler, Memphis, Tenn.—I have seen quite a number of patients wearing a truss for the purpose of retaining a kidney in place and most of these, as mentioned by Dr. Crawford, gave some relief. It has always been impossible for me to understand how relief can be given in these cases by the aid of a truss. If you will consider that the anterior abdominal wall is subject to motion with each muscular contraction and with each position of the body, you will get the idea that I wish to convey. In other words, it looks impossible to place a truss on the anterior abdominal wall for the purpose of holding up a kidney and expect it to do so without producing a pressure necrosis. The kidney will be sure to sag around the truss and get down below it. The same thing holds true in cases of pessaries ,used for the purpose of holding the uterus in position. They are both mechanical impossibilities.

Seven years ago I devised an operation, which can be seen in the literature, for anchoring movable kidneys, which has proven entirely satisfactory in my hands in every case. I might incidentally mention that in this operation along with other features I advised the divulsion of the old original kidney fossa that has been obliterated. For this purpose I insert my fist in the wound and carry it up under the diaphragm and over the liver and use sufficient pressure to push the diaphragm and liver away from the former kidney fossa so as to make a sufficient bed in which to anchor the kidney, and to give it the necessary room. The other part of the technique is too extensive to be given in this discussion. I enjoyed Dr. Crawford's paper very much.

Dr. Bacon Saunders, Fort Worth, Texas.—I want to say a few things about this paper. I am exceedingly glad the doctor wrote it and hope every one heard it. I am afraid that they did not, however, the acoustics of the room is so poor.

Movable kidneys,—traumatic, especially, are very much like traumatic ruptures; they are few and far between, and when they do occur, you have a case that tells a clinical tale, just as the doctor has described. As in genuine traumatic ruptures you have a definite clinical story, so in the rare cases of movable kidney due to traumatism. One of the greatest difficulties confronting us in this question is the large number of women who have movable kidneys from various causes not traumatic in nature and the frequency with which their medical advisors, for various reasons satisfactory to themselves, I suppose, make a great bugaboo of this generally harmless condition. I have seen them with floating kidney thirty years ago, and they have been happy ever since and have had several babies, and did not know they had a movable kidney.

I think a doctor does the woman harm if he accidentally finds just a movable kidney and tells her about it unless it is causing unmistakable symptoms and that is very rarely indeed the case. If you once mention "float" she thinks it is moving around like a cork in a bath tub; so don't tell he she has it. If all of us doctors could know when we are examining women, and men, too, for that matter, that they have a movable kidney, and say nothing about it, and especially if we examine a woman with recent traumatism who has simply a movable kidney and no other symptoms, if we did not aggravate her symptoms by telling her she had a movable kidney, when the accident had nothing to do wit it, the woman would be much better off.

I have had lacerations of the kidneys, some I had to remove, and have never seen a movable kidney follow one of those injuries. Have seen them have hemorrhages for days, where the kidney was lacerated; it was injured but not followed by a movable kidney.

I am from "Missouri" on the question of traumatism causing "floating" kidney, except possibly in rare cases where there are well defined symptoms as a direct sequence to the injury just as in cases of supposed traumatic hernia that gives no special symptoms and does not appear manifest for three or four weeks after the injury. I think the woman with a movable kidney and also most individuals who developed hernia after slight injury really had it before and had never had their attention called to it.

The paper is an exceedingly important one from this point of view. Separate the idea of traumatism from the great majority of movable kidneys that we have, and it will be much nearer the truth.

I thank you very much.

Dr. Crawford Closes.—In regard to the psychic side of the treatment of movable kidney. May I say that if the adjustment of a comfortable pad or mechanical contrivance of any kind relieves the mental state of the individual who has this condition it has accomplished its purpose, whether or not it does, in any sense, limit the inability of the kidney. We know that not one-tenth of those who have movable kidney ever have any symptoms that we could directly refer to the kidney itself, and, as I said, if we are fortunate enough to have impressed that individual that we are doing something for him or her, we have done all that is necessary. It is very much simpler than having to subject them to an operation.

Further, in emphasizing what Dr. Saunders has said in regard to a traumatic rupture in connection with these cases: a patient who has had a traumatic rupture of the kidney ought to have a more firmly fixed kidney unless the damage done to its structure is so great as to necessitate a nephrectomy. The formation of fibrous tissue incident to the trauma gives the kidney added fixation.

EYE, EAR, NOSE AND THROAT

CONGENITAL CATARACT—HEREDITARY INFLUENCES.*

By Rosa H. Gantt, M.D.,
Spartanburg, S. C.

Etiology of cataract is easy to determine where the cataract is due to general disease, as diabetic cataract or cataract due to nephritis. In dealing with senile cataract we know that it occurs in old people, not making its appearance usually till after the fiftieth year of life; and we have come to attribute it to the effect of age, regarding it as a physical change, such as getting gray, becoming presbyopic, etc.

However, in dealing with congential cataract we are at a loss to account for its etiology further than saying that it is some disturbance of the development, or an intra-uterine inflammation of the eye. The profession recognizes the fact that heredity makes its influence felt in non-congenital and in senile cataract, and there are those who believe that congenital cataract is due to an inherited tendency, just as are myopia or mental deficiency.

It was the discovery of a family in which there were three sisters blind with congenital cataract, and the history of a first cousin in the same condition, that directed my attention to the hereditary theory. It was emphasized by the fact that two of the children were twins. The family history, though vague, evidenced cataract in preceding generations. Incidentally it developed that among the immediate relatives there had been born eight pairs of twins. Other cases giving histories of hereditary tendency to cataract came under my observation when I began to look for them.

My attention was drawn to the fact that Dr. John L. Dickey, of Wheeling, W. Va., had, as far back as 1896, called attention to a cataractous family; in 1898 another and in 1899 a third. Dr. Brazear reported cases in 1913, and Dr. Campbell, of St. Louis, reported in 1913 seven or more in the same family, all developing cataract between the ages of twenty-five and thirty-five. In corresponding with Dr. Munsey, of the Eugenics Record office, upon this subject, she reported to me a family in which there were twenty-seven cases in four generations, and another of eight cases in three generations. Other reported families were brought to my attention.

All further effort on my part to gather statistics came to an end when I found that in 1908 Dr. Clarence Loeb, of St. Louis, Mo., in discussing "Hereditary Blindness and its Prevention" before the American Academy of Opthalmology and Oto-Laryngology, had collected the result of researches of one hundred and four authorities, showing in the aggregate three families in which both parents were affected with congenital cataract, with 60% of their children affected; three hundred and four families with one parent affected, with one thousand and twelve children, of whom five hundred and eighty-nine, or 58%, were cataractous. Dr. Loeb further reported 61.8% cataractous among collateral relatives.

We recognize the hereditary transmission of parental characteristics in the shape and anomalies of the eye as a fact daily brought to our notice. We have all noticed that children of astigmatic parents are liable to be astigmatic, the same applying to myopia.

Statistics show 58% of the children of cataractous parents to be cataractous, while the percentage of affected of normal parents is small. When our observations show a tendency to cataract to prevail in certain families the mind is forced to the conclusion that there is some strong relation between heredity and cataract.

The fact that cataractous parents may have apparently normal children offers no proof against the influence of heredity, because such a condition is in full accord with the known law of hereditary transmission. It is not necessary in order to accord with the Mendelian law that a defect will appear constantly in all progeny. The essentials of Mendelian principles are: first, that the properties of organisms are due to distinct, detachable elements, separately transmitted in heredity; and second, that

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the parent can not transmit to an offspring an element which that parent does not possess. As applied to the defect of cataract, the cataract is due to a distinct element, and no parent not possessed of the cataractous element is able to transmit the defect. Again, we all know that in animal and vegetable life each germ, cell, or ovum, arises from the union of two germ cells in fertilization, and it follows that resulting cells are formed by the union of two cells, and that the presence or absence of a characteristic or a defect depends upon whether the union is between affected, between disaffected, or between affected and disaffected cells. The union of affected cells forms a cell with characteristics of the affected. The union of disaffected cells gives a new cell with characteristics of the disaffected. The affected, when joined, have no power to transmit other than their kind. The union of disaffected germs or cells can not transmit a defect. It is the principle that the presence or absence of characteristics depends upon the purity of the germ cells transmitted to the progeny and the further principle of the production of germ cells in proportion of purity or affection of parent cells as announced by Mendel, which has been fully confirmed.

When the union of the parent cells is between those of similar characteristics the problem is simple, for like produces like. When the union, however, is between parent cells of dissimilar characteristics, the resulting cells will be heterozygous in character, will possess the power to transmit the characteristics of either of the parent cells, upon proper union, and will itself possess the characteristics of either one or the other of its parents, the characteristic that it possesses will be the dominant characteristic, and the characteristic that recedes from view with the union is inheritable, but is recessive in character.

The result of union, therefore, of germs of dissimilar characteristics is a new germ possessed of the dominant characteristic, but also possessed of the power to transmit both dominant and recessive characteristics to its offsprings.

All inheritable defects are transmitted, if in accordance with the Mendelian law, in equal proportions, and transmitted either as a dominant or a recessive characteristic.

It has been stated that congenital cataract is transmitted as a dominant characteristic. If this is true, the question arises, how does it dominate? As a positive apparent cataract? Or as an inherited tendency to inflammation of the eye with attendant opacity of the lens? If dominating as a positive apparent cataract, its positive appearance should be manifest in the eyes of succeeding generations. If it is the *tendency* to inflammation that is the dominant factor, a cataractous parent might produce a heterozygous offspring, normal to all appearances, yet with latent power to develop and transmit cataract, apparently setting at naught the salient difference between dominant and recessive characteristics.

If the premise that a cataract is the sequel of an inflammation is correct, other factors enter into the determination of its transmission. The tendency to develop an inflammation, plus the conditions under which inflammation develops, are the factors. The conditions for the development of the inflammation may not arise in utero, and congenital cataract may not appear, or conditions may arise in early manhood and produce a pre-senile cataract, or in later years result in the production of a senile cataract. We recognize this principle in the transmission of tuberculosis; why not apply it to the transmission of cataract? The time at which the cataract appears in the life of the individual causes us to denominate it as congenital, presenile or senile. Why can not we recognize the truth that they are all dominated by the same hereditary tendency, the same hereditary influence, but different only in point of time, because of the absence of pathological conditions suitable for their development and appearance?

Again the problem as to hereditary influence in cataract is further complicated by the truth that the descent of abnormalities are in some cases limited wholly or in part by sex. It is stated as a fact that color blindness affects males with much more frequency than females. Normal women transmit the affection to their sons, but it is rarely if ever transmitted by the fathers. It is established that sons of color blind males do not inherit the abnormality, and therefore do not transmit

it. The daughters of color blind fathers inherit it, though it does not appear in them, and they apparently have the power to transmit it to their sons. Sons of color blind women will all be color blind. The same system of sex limitations is apparent in one form of nystagmus, in optic atrophy the males are affected and can transmit the disease; the women transmit the disease, but rarely develop it. Again in dealing with hereditary tendencies in the eye, we deal with four parental eyes, often of varying characteristics, shape, visual power, etc. We deal with them under fixed hereditary laws, but under laws that seem to vary as to defects and tendencies. We gather our data and information from unwilling witnesses of hereditary taint. It is, therefore, not surprising that more accurate knowledge has not been obtained.

It is generally stated that twelve forms of blindness are distinctly characterized by the property of hereditary transmission. If this is true congenital cataract has plenty of company in its hereditary transmission.

Observations by eugenists further reveal that feeble-mindedness, epilepsy and nystagmus are prevalent in those families in which congential cataract develops. It is impossible as yet to say whether these traits are associated or whether they are unit characteristics, just as it was impossible for me to say in the case that came under my observation whether the twinning came from the same or from a separate determiner as the eye troubles. In fact, observation of sporadic cases will never definitely determine anything except that we suspect that congenital cataract is influenced by heredity.

Scientific and persistent observation in medicine has established beyond question the transmission of syphilis, epilepsy, insanity and imbecility, and the hereditary tendency to other diseases.

Establish the truth that congenital cataract is hereditary, and the proposition follows as an axiom that it is transmitted according to a fixed hereditary law, for the laws of nature are fixed. Recognition of the Mendelian law has given rise to the science of eugenics, and while the youngest of recognized sciences, it is daily performing wonders in the vegetable and the animal kingdoms. We see the wizard Burbank changing the thorny cactus into food for stock, the marguerite into the beautiful Shasta daisy; a South Carolina farmer has changed the fleecy white staple of the Southern fields into brown and green. The cattle men of Texas have shortened the horns of the Texas steer and shortened and broadened his body. The enlightened commonwealths have called this knowledge to their aid in solving the problem of the insane, the pedagogue in dealing with the feeble minded, and the judge in determining and dealing with the youth with inherited criminal tendencies.

If congenital cataract is propagated according to the Mendelian law the profession should know it and be able to establish the fact beyond question. We should know the exact nature of this defect. We should know its origin; we should know its mode of transmission; we should know its variability within the group, and we should know its relations to any other peculiarity which the affected individual may show.

Sporadic effort can accomplish little, for the establishment of hereditary laws involves the consistent accumulation of data, the careful collection of family histories and the tabulation of results of skilled eugenists. Such accurate modern methods as are used by life insurance companies to compile mortuary tables must be adopted to discover statistical truth. If statistical truth is established, fundamental laws of heredity will follow. The truth and the law having been established, remedies will follow.

Behind the knowledge thus obtained may be a complete reform in the methods of caring for the blind of the nation, and great steps taken in preventive medicine in dealing with those of defective vision.

THE RELATION OF SYSTEMIC CONDITIONS TO OCULAR DISEASES.*

By John O. McReynolds,
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Dallas, Texas.

In attempting to present a paper before a body of experienced ophthalmologists,

*Read in Eye, Ear, Nose and Throat Section, Southern Medical Association, Ninth Annual Meeting, Dallas, Texas, Nov. 8-11, 1915.

I am fully conscious of the extreme difficulties involved, and it is only my confidence in your sympathetic indulgence that has encouraged me in this very hazardous task.

We are all familiar with the exhaustive researches in this field during the last quarter of a century, and we appreciate the fact that a very incomplete survey of the subject would more than consume the entire time of our Section. A mere catalogue of the hundreds of important general diseases and various local affections associated with definite ocular changes would carry us far beyond the limits of time allotted to this paper, and hence my only purpose today would be to offer a few practical observations that have impressed me in my own personal experience.

The value of such conferences of medical men as we are enjoying today depends not alone upon the presentation of the finished product of original research, but also upon the interchange of views with regard to the field of study most in need of laborers and the cardinal veins of truth that point the way to the deeper and richer mines of knowledge still unrevealed or undeveloped.

A frank and honest announcement of a real difficulty, a genuine problem to be solved, may become an incentive to the investigating genius of many and thus lead to positive results of great value.

Then may we ask ourselves the question: "Where is our professional equipment most deficient? Where do we really find ourselves drifting upon the sea of doubt?" I am sure that a little reflection would lead us all to the same conclusion. It is certainly not in the accurate details of operative technique, for these are attractive, obvious and easily understood. It is not in the methods of examination of the different anatomical structures strictly within our own field, because every refinement of mechanical contrivance has been brought into requisition. Ophthalmology is the oldest of all the specialties and it is certainly upon the most scientific foundation, but, judging from my own experience and observation, I am convinced that our most urgent need is in that ever-widening domain of the relationship of systemic conditions to ocular diseases.

Some phases of this subject have been very thoroughly developed and this is especially true of the relation of neurology to ophthalmology. The very nature of neurology invites an accurate analysis and definite localization of lesions. The neurologists like Charcot, Gower, Horsley, Ferrier and Hughlings Jackson and others have been masters of ophthalmoscopy, an accomplishment which has received scant attention at the hands of physicians and surgeons in general.

As a result we have acquired some very exact knowledge concerning the ocular changes associated with such intracranial affections as tumor, abscess, hemorrhage, embolism, thrombosis, meningitis, insanity, anaemia, hyperaemia, encephalitis, cortical and basilar lesions, bulbar paralysis and allied diseases. And also the well established affections of the cord and nerves like tabes dorsalis and multiple neuritis and the long list of functional disorders like hysteria, neurasthenia, migraine and scintillating scotoma, chorea and other neuroses.

The dermatologist likewise has been able to give us a very positive diagnosis as to the various cutaneous affections as erysipelas, eczema, herpes, lupus and luetic eruptions. More recently the relation of diseases of the accessory sinuses to the eye has been greatly simplified by the judicious assistance of the X-ray. One of the most thoroughly developed influences upon the eye is that of disturbed function of the kidneys and liver as shown in the retinitis albuminurica and diabetica, together with such constitutional states as Basedow's disease, myxoedema, leukaemia and haemophilia.

The various infectious diseases like septicaemia, pyaemia, rheumatism, endocarditis, measles, scarlatina, smallpox, pellagra, malaria, tuberculosis and syphilis are all definite maladies and the ocular changes have been systematically recorded and carefully investigated.

Within the last few years an enormous amount of experience has been collected to demonstrate the very marked influence which diseased teeth and other oral affections have exerted upon the integrity of the eyes. So impressed have I been with the importance of this factor that I find myself investigating the condition of the teeth in every case of serious ocular trou-

ble. Indeed, I have sometimes been astounded at the rapidity with which some grave diseases of the eyes, particularly certain types of uveal inflammation, would clear up only when the correct attention was given to the teeth.

The importance of the tonsil as an avenue of infection has attained rather startling proportions, and while this gland is doubtless responsible for a vast variety of affections, it is necessary to use some precaution not to give the patient too positive assurance that its removal will bring them the desired relief. I trust that you will pardon me if I seem to emphasize this fact unduly, because I can see the possibility of harm to the patient and to the profession by a reckless attitude on this subject. I am in the habit of making a complete tonsillectomy in every case in which I make any kind of operation on the tonsil, because it is altogether more satisfactory to the patient and to the surgeon, although I am disposed to the belief that it is especially the submerged upper two-thirds of the gland that is prone to give rise to toxic phenomena.

I feel that the recognition of the role of diseased tonsils in the production of the various toxaemias is one of the most signal contributions to modern medicine and surgery. The evidence establishes the conclusion that the effects of these toxins vary exceedingly and we have not yet arrived at a complete understanding of their scope. It becomes a problem, therefore, to determine more definitely than is possible today the exact pathological changes in the eye which may be reasonably anticipated from certain types of tonsillar disease. I am quite confident that the toxic manifestations will vary with the extent of absorption and possibly also with the character of toxin which is not necessarily identical in all cases. Some of these toxins may be found to have a special affinity for nerve tissue and hence will tend to produce some form of true optic neuritis or even a functional disturbance in vision. The uveal tract also is especially liable to suffer from any form of slowly progressing toxaemia. One of the most distressing ocular conditions not associated with diminished visual acuity is asthenopia, due to toxaemia and affecting the energy of the extrinsic and intrinsic ocular muscles and the nerves supplying them.

We may not be able in every case to detect the source of infection, and indeed we must recognize that there may coexist more than one source and more than one character of infection tending to establish a given train of manifestations. Our duty, then, would be to use every endeavor to prevent absorption of toxins from all of these different sources and supplement these measures by judicious elimination in a general way without waiting for that complete knowledge which may be kept in store for future generations.

DISCUSSION.

Dr. Homer Dupuy, New Orleans, La.—I shall limit my remarks to the accessory sinuses. Some years ago, in co-operation with Dr. H. D. Bruns, of New Orleans, I carried on a series of clinical investigations with regard to the influences of sinus affections on diseases of the eye. I reported my conclusions before the Louisiana State Medical Society. Briefly stated, tney were:

1. The mere obstruction of the outlets of one or more of the nasal accessory sinus outlets, without an associated sinus inflammation, did not cause apparent eye troubles.

2. It was only the suppurative forms of sinus affections which had actually led to inflammatory ocular disturbances.

These conclusions have suffered no change by a more extended experience. When irido-cyclitis, or vitreous opacities, or optic neuritis, or neuroretinitis, or other serious eye diseases are the result of some sinus affection, pus is invariably present in the offending sinus. No mere stenosis of the outlets can bring about the lesions referred to.

Dr. D. W. White, Tulsa, Okla.—It was a great pleasure to hear Dr. McReynolds open up this subject. I feel that it is being neglected in every way. I may remark about one case in which a man had a choroiditis. There had been a Wassermann made and a blood count, but outside of that there was no other examination. So finally I had a metabolism made, and, to my great surprise, found a colon condition. After the colon condition was treated, the man's vision was finally restored. When he came to see us in the first place all he had was light perception, and six weeks later he could read a large print. This is only one of the many cases in which we had success with systemic treatment, and I trust that Dr. McReynolds' paper will open up a big field and let us do some of the work, and don't let those cases go on to blindness when you can secure laboratory examination and secure a true diagnosis and effect a cure in many hopeless cases.

Dr. Robert E. Moss, San Antonio, Texas.—I wish to report a case where there was a chronic neuritis of right shoulder and arm, seemingly caused by pyorrhea of tonsillar crypts.

The patient, a highly educated lawyer, was

brought to me by his brother, one of our up-to-date physicians, to have me examine his tonsillar crypts. We have not been associating in our minds the streptococcus as a cause of neuritis but syphilis, therefore I examined his optic nerves and found a very decided optic neuritis, also, much to the surprise of the patient, the vision of the right eye was reduced to 20-100 and the left eye to 20-30. He was very positive about not having had syphilis. The Wassermann was negative; therefore, I presume his neuritis was due to the streptococcus.

Dr. J. H. Barnes, Enid, Okla.—I want to report a case of severe plastic iritis which was caused by the condition of the teeth. This case was treated some six weeks for plastic iritis which had no vision at all, owing to the plastic condition; impossible to keep the pupil dilated so as to keep down the adhesions to the lens. The history of this case was that for several years he had recurrent iritis. It was not treated, but at this time it was much severer. The patient stated to me that he had used before just simply some boric solution dropped into the eye, and after a few days it would always clear up the condition, but this time the eye which was treated by himself for four weeks had done no good at all. I had treated this case for more than one month and advised him in the first instance to have his teeth cleaned up, and when I insisted upon his having his pyorrhea treated and his teeth cleaned after one month's treatment, he consented to have this done. In ten days' time it began to clear up and, to my surprise, the adhesions let loose under the treatment of atropin and as I say in ten days the vision returned normal, and now it has been four or five months and he has had no recurrence of his trouble. There is one condition that illustrates the doctor's paper very forcibly that I have overlooked. It is the condition of the teeth in all of those ocular troubles.

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MEDICAL PREPAREDNESS FOR NATIONAL DEFENSE.

Preparedness for national defense is the most absorbing topic of the day. In every newspaper and magazine we see discussed various plans for increasing the army and navy and otherwise strengthening our national defense. A number of bills have been drawn and are now pending in Congress with that end in view, while, according to reports in the papers, others are being prepared and will be introduced as substitutes for some of those now on the Senate and House calendar. But little, however, has reached the lay press regarding the most important phase of the preparedness question, i. e., the provisions for protecting the citizens of the United States who may enter the army as regulars, or as national guardsmen, against the diseases which have killed more soldiers than the shot and shell of their enemies. Mortality records from our Civil war and the Spanish-American war show the crime of medical unpreparedness in our military system and it is hoped that our country will profit by its mistakes in those conflicts.

The horrible mistakes, and the inexcusable deaths of many patriotic American citizens from infectious and contagious diseases during the Spanish-American war are still fresh in our memory. More American soldiers were killed (2,192) and wounded (21,000) by typhoid fever alone than from Spanish bullets, not to mention the thousands who were ill, and the hundreds who died, of malaria, yellow fever and other tropical diseases during the invasion of Cuba. Surely our statesmen in Congress and in the Senate will remember our experience of 1898, and in enacting legislation for increasing the size of our army they will provide for an adequate increase in the number of medical officers.

While there was inexcusable loss of life from disease in the Spanish-American war it was the most beneficent conflict in the history of man; because out of it resulted discoveries and methods in sanitation that will save more lives than have been lost in all the wars in all the centuries that have passed. The United States Army Commission for the Study and Prevention of Yellow Fever, consisting of that great trio of immortals, Reed, Carroll and Lazear, by proving the mosquito transmission of that most dreaded of all tropical diseases, performed one of the greatest services ever rendered mankind. This discovery by United States Army surgeons has saved thousands of lives and has done more for the development of the tropics, and also for our Southern ports, than any other contribution to science from any source.

The Spanish-American war also developed the greatest sanitarian in the history of the world. The work of Gorgas, an Army surgeon, and his associates in devising and applying the methods for the prevention of yellow fever and malaria, based upon the mosquito transmission of those diseases, is one of the brightest pages in American history. For the first time in a century Havana was freed from yellow fever and malaria and our Gulf and Atlantic cities are forever relieved of the fear of the dangers and horrors of epidemics of the dreaded "yellow jack". Ex-President Taft said that the completion of the Panama Canal, the greatest industrial undertaking in the history of the world, was directly due to the work of the sanitary corps under Gorgas.

Indeed the record of the United States Army surgeons in the Spanish-American war was one of wonderful achievement. The unnecessary loss of life from disease by the American troops was due to placing untrained civil surgeons in charge of the camp sanitation of volunteer troops and to general medical unpreparedness.

It is most fortunate, at this time when military preparedness is being considered, that the greatest sanitary genius of the age is Surgeon-General of the United States Army and that his wisdom and experience can be utilized in shaping legislation for an adequate medical department of our military establishment. Be it said to the credit of the Committees on Military Affairs in the United States Senate and Congress, they are endeavoring to act on the advice of Surgeon-General Gorgas. He was called before their committees and testified as to the best methods to increase the efficiency of the army medical corps and presented an outline of a bill which would carry his recommendations into effect.* General Gorgas recommended seven medical officers per thousand of troops. The number now is five per thousand which is inadequate even in time of peace. General Gorgas made other recommendations that are of great importance but which cannot be discussed in a brief editorial. Congress should act upon the advice of the one man best prepared to know the methods for preventing disease among our troops and who is best informed as to what is needed for the adequate care of the wounded in battle.

It is the duty of physicians and surgeons to take an active interest in legislation for medical preparedness in the United States army. Most of us would feel called upon to serve in the event of war and but few physicians or surgeons have had any sanitary or military training. It is imperative that Congress provide a sufficient number of trained military surgeons to train the Medical Reserve Corps and the medical officers in our National Guard to be available for immediate

*Hearings before the Committee on Military Affairs of the United States Senate, Part 14, pp. 703-710.

service at any moment war should be declared. Perhaps we can best serve our country at this time by writing to our Congressmen and Senators urging them to support the legislation as recommended by Surgeon-General Gorgas for increasing the efficiency of the Medical Corps of the United States Army.

THE PELLAGRA SITUATION IN MISSISSIPPI.

The Mississippi State Board of Health published in December a report on the prevalence of pellagra in Mississippi and outlined measures for a state campaign against that disease. In this report Dr. F. L. Watkins, Deputy State Registrar of Vital Statistics in Mississippi, presented a statistical report of pellagra in that state which is a model of concentrated information, and his comments thereon are logical and his suggestions practical. The Mississippi State Board of Health unreservedly accepts the Goldberger theory that "pellagra is not a communicable disease, but that it is essentially of dietary origin." In support of this position the board mentions that no man in the army or navy or marine corps of the United States ever developed a case of pellagra "who did not have it at the time of or before enlistment." It also mentions Lavinder's statement to the same effect concerning the Italian army. All these bodies of men, many of whom come from pellagra districts, are amply fed on a ration whose nutritive elements are scientifically proportioned to promote and sustain health metabolism. The board infers that if a properly balanced diet is all that is needed to protect people against pellagra it should be an easy matter for Mississippi to accomplish that most desirable consummation, and refers to an instance within her own boundaries that seems to the board conclusive. In two orphanages in Jackson there were, in 1914, 209 cases. In 1915 the inmates were fed on a properly balanced diet and there was only one recurrence. It is not necessary to incur the expense of fresh meats for the purpose, as the free use of legumes will answer every end and an abundant supply could easily be raised in the state. The statistics offered reveal a serious amount of pellagra in all of the eighty counties. In 1914 the number of cases reported was 10,954. In 1915 reports indicated an increase of 47 per cent., or about 15,000 cases. Dr. Watkins thinks that this increase in the reports is partly accounted for by the larger number of physicians making regular reports and that the actual increase was about 26 per cent.

Some peculiar features are noted. For instance, the fatality among whites is 6.5 per cent.; colored, 13.4 per cent. The number of deaths among widows who are pellagrins is twice as great as among the married women. Three times as many females as males die of pellagra. The greatest morbidity is in June and July, no satisfactory reason for this fact being offered. There is not a county in the state that is exempt from the disease, with fatalities in all. It is more than twice as prevalent in the country than in cities and towns. Next to tuberculosis it causes the largest number of deaths.

The State Board of Health considers it the duty of the state to educate the people as to the prevention of the disease and the duty of the counties to make provision for those suffering with it. A state hospital for pellagrins is considered impracticable. A central institution built by the state to accommodate over 10,000 pellagrins would have to be of a size and an expense to conduct that the state could not accomplish without bankruptcy. The money required for the mere railroad fares of the patients

would be enough to pay for their proper treatment at their homes.

The board's estimate for the measures required and their cost is as follows:

The Legislature should give $30,000 per annum for the next two years, to be expended as follows:

Eight Pellagra Field men, salaries $1,800 each	$14,400
Expenses of the same, $1,200 each	9,600
Printing and other necessary expenditures	6,000
Total annual appropriation	$30,000

The State Superintendent of Education, the State Commissioner of Agriculture and the State Board of Health, working together with the Pellagra Field Men proposed, could accomplish all that is necessary, including the education of the people and the raising of abundant leguminous foods. The Legislature could also invite the aid of the United States Public Health Service, with its perfect organization. Public interest is already aroused in this matter to an unusual degree and the board of health seems to think that if the proper effort were now vigorously made pellagra in Mississippi could be reduced to a negligible quantity, as has been done with yellow fever. It is to be hoped the legislators of Mississippi will carry out the recommendations of its most efficient State Board of Health.

THE PREVENTION OF BLINDNESS.

Who can fathom the despair of one who is condemned to live in unending darkness! Though one may not remember ever to have seen the light yet the difference between his lot and those of his more fortunate fellows is constantly present in his consciousness, and causes him a restless sorrow. And when we, who are blessed with vision, realize that at least one-half of the existing blindness was inflicted by negligence or ignorance and is entirely unnecessary, then the impulse of pity becomes tinged with indignation and we are at once moved to inquire who is to blame and how such a misfortune may in the future be averted. Therefore it is not surprising that in this day of organized effort there has been formed a country-wide society whose object it is to take such steps as are necessary to insure the protection of the helpless or the uninformed against this awful deprivation. It is called "The National Committee for the Prevention of Blindness." Its headquarters are at 130 East Twenty-second Street, New York. It is composed of some of our most widely and favorably known citizens and it is already accomplishing splendid results. Its very efficient Field Secretary, Mr. Gordon L. Berry, is now visiting several Southern States in the effort to increase interest in various boards of health, medical societies and welfare workers generally. He expresses himself as being much pleased with the co-operation he is receiving in the South.

The work of the committee includes a thorough study of the causes, direct or indirect, of blindness; the advocacy of measures to eliminate those causes; and the education of the people concerning all matters pertaining to the care and use of the eyes. They propose to furnish, at cost, to workers for the conservation of vision, literature containing the latest information on the subject, for distribution, and to aid in the formation of societies for the prevention of blindness. They will co-operate with other organizations to secure proper legislation and will from time to time publish reliable news on the subject.

At present there are but seven state commissions, with appropriations, with whom this national committee can co-operate, and there are none in the South. Most of the states have schools for the blind and all their officials are in active

sympathy with this work for the prevention of blindness. Unfortunately the most prolific cause, ophthalmia neonatorum, is not as regularly reported as it should be, the officiating midwives being too ignorant or too indifferent to do so. Dr. W. H. Hibbett, City Health Officer of Nashville, believes that to eliminate blindness we must first eliminate midwives. But there is a use for midwives, properly taught and rightly controlled. In some of the Southern States midwives are required to register and pass an examination of a simple kind. They are taught that it is their duty to instill into the eyes of the newly born the one per cent. solution of silver nitrate that protects against ophthalmia neonatorum. The law should stitpulate that in reporting the birth she should state whether or not this duty had been fulfilled. Any negligence on her part should be severely punished and her certificate should be revoked. The employment of an infant-welware nurse in closely populated places would help to enforce this provision of the law and to filter out the midwives who were least reliable. The Independent Presbyterian Church in Birmingham is making a practical demonstration of christianity by employing an infant welfare nurse, a part of whose duty is to inspect the eyes of the new born babies of the poor in this city. Other churches and other organizations in other cities would do well to follow this example. In rural communities, especially in the South, there would sometimes be insuperable obstacles to the performance of this duty, but the county health officer could appoint some competent person to inspect each infant as soon as each birth is reported and thus at least keep track of those officiating at the birth, and the existence of ophthalmia neonatorum in the infant should be *prima facie* evidence of the culpability of the attendant, whether midwife or doctor.

From every point of view the subject is important, whether on account of the burden on society of so many incompetent though innocent sufferers, or because of the enormous loss to the state by the removal of so many otherwise valuable workers from the ranks of producers; but first it rouses the sympathy of every normal human being and wakens a desire to in some way render more bearable the gloomy existence the blind must endure.

FEDERAL AID TO HOT SPRINGS, ARKANSAS.

In this number of the Journal is published an article by Dr. E. H. Martin of Hot Springs, read before the last meeting of the Southern Medical Association, in which he presents a scientific discussion of the therapeutic properties of the Arkan- Hot Springs Baths. He seems to prove that the waters of this American resort are of greater value in the treatment of a number of diseases than those of the celebrated European Spas.

Dr. C. T. Drennen, also of Hot Springs, has written and published a forcible argument favoring the establishment of a great national health resort at that place. He observes that the United States government has already established there a bath house in which the poor of the world bathe free, nearly 126,000 baths being given there in 1915. But there are no arrangements for the accommodation and care of the indigent thousands thus invited by the government to the baths. There are also other government institutions in the city, and the sewage from all of them empties into the sewage system that serves the rest of the city, and enlargement is seriously needed.

Now seems to be the opportune time to firmly establish our own great spas by government aid, as has been done for the spas of Europe. The amount

of money that has been spent at those European spas by citizens of every civilized nation is incalculable, but so likewise is the good they have done. The hot springs of America, lying in different states, are therapeutically the equals of any others in the world. The source of their undeniable efficiency is now thought by some investigators to be the "radium emanations" which science has demonstrated to exist in efficient quantities in most of those best known to the public. The United States government in 1832 set aside the Hot Springs Reservation in Arkansas as a national sanitarium forever. The few government buildings now there are not enough to constitute it a national spa. True, there are many superb hotels and bath houses, but they lack the size and magnificence that should characterize a national resort. The present effort is to raise by the joint contributions of local investors the sum of ten million dollars, the amount to be duplicated by congress and wisely expended under suitable direction and control to create a national sanitarium that shall be a refuge to the suffering ones of the nation and an honor to the government; a sanitarium with abundant and suitable accommodations for not only the citizens of the United States, but for visitors from all over the world.

The topography of Hot Springs is admirably adapted to reward the most ambitious efforts at embellishment. It calls for development with many spacious and artistic buildings, permanent and beautiful; with hospitals, sanitariums, hotels, baths of all kinds, libraries and gymnasiums, theaters and auditoriums, framed in broad avenues bordered with trees and punctuated with fountains, where the peoples of the earth may meet in friendly intercourse under the hospitable shade of Old Glory, the sick and afflicted come for sure relief; where none shall be too poor to be welcomed and none too great to be entertained, and all shall be forced to admire nature's therapeutic gifts to North America. The government can well afford to include this development in its plans for preparedness as a great inland sanitarium for its invalided or convalescent soldiers. This is no impossible, irridescent dream, but a great, a magnificent possibility, whose realization seems actually to be within sight.

The JOURNAL hopes to see its accomplishment.

SURGICAL TECHNIC IMPROVED BY WAR.

The unlimited amount of experience the great war has afforded to military surgeons has resulted in a wonderful improvement in technic, though no new principle seems to have been developed. The greatest advance appears to be in the use of the X-ray in locating foreign bodies in the tissues, increased portability of apparatus having rendered its use more generally available. A motor car, fitted with all needed fixtures, whirls up to the place where the wounded have been gathered. The operator steps out, adjusts his instrument, retreats to his portable dark-room, and in twenty minutes hands the surgeon a picture of the missile and its location. If necessary he can detect the exact depth to which the operation must penetrate. Some forms of X-ray apparatus weigh but thirty pounds complete and can be carried in a suit case with all necessary appurtenances.

Carrel has been busy with his supremely delicate manipulations, but so far has not announced anything new; but it is known that at least in one instance he has successfully transplanted a kidney, thereby saving a human life. His new antiseptic, based on hypochlorite of soda, with its irritating properties neutralized with carbonate of lime and boric acid, is applied

directly to fresh wounds and may be left there a week. It is remarkably efficient. An interesting rumor has it that two English surgeons have been experimenting with garlic juice as an antisuppurative dressing, a measure in vogue three hundred years ago. They report that it checks suppuration and so promotes the flow of lymph that in forty-eight hours the wound is under control. A lay paper states that a solution of nitrate of silver, "one part to two hundred thousand of water," is being used on burns caused by liquid fire. No doubt the water is beneficial, but the effect of one grain of silver nitrate dissolved in over three gallons of water is problematical. Probably the figures are wrongly stated. One thing is certain beyond dispute. Surgical technic has been advanced beyond what had formerly been imagined as possible, and when the war is over medicine and surgery will possess a mass of official records which will be an inexhaustible mine of information to this and the succeeding generation.

CONTEMPORANEOUS MULTIPLE INOCULATION.

In the "Report of the Auditory Committee for the Tropical Diseases Research Fund for 1914," there is published an article by Dr. Castellani embodying his conclusions concerning the inoculation of animals and human beings with two or more different vaccines at the same time, thereby avoiding the inconvenience of separate inoculations and the loss of time consequent on successive reactions. The reaction from a multiple inoculation, he says, is no more severe than that caused by a single vaccine, and the protection is equal against each of the several infections to that assured by the single vaccine for each disease.

The following named vaccines have been successfully used in man in various combinations, the typhoid inoculation being present in all: Typhoid, paratyphoid A, paratyphoid B, Malta fever, Bacillus Asiaticus, Bacillus Columbiensis, dysentery Kruse-Shiga, dysentery Flexner No. 1, dysentery Flexner No. 2, cholera, and plague. In some instances seven or eight different vaccines, "a sufficient minimum quantity" of each, were combined in one inoculation. When a mixture contains the plague vaccine the reaction is severe, "though apparently rather less so than after Haffkine's simple plague vaccine." Dr. Castellani prefers carbolized emulsions of agar cultures in normal salt solution without heating, 0.5% of carbolic acid being sufficient. He thinks they cause a less painful local reaction than broth cultures killed by heat. However, the typhoid and paratyphoid vaccine is also prepared by heating broth cultures. The convenience of being thus able to secure immunity against several threatening diseases by a contemporary inoculation of their combined vaccines is self-evident. Persons contemplating travel through regions believed to be variously infected can prepare for the journey in a much shorter time and with less inconvenience than would be possible if the time necessary for separate inoculations were required. Especially in the case of preparing for a military incursion and a long campaign in an infected region would this procedure be invaluable. Exploring expeditions, and the relief undertakings of the Red Cross organizations, should find in this advance a valuable aid in assuring them safety from one of the chief dangers that threaten them. The subject was brought to the attention of the JOURNAL by an extract published in the United States Public Health Reports, dated December 31, 1915.

TREATMENT OF POISONING BY MERCURIC CHLORID.

In the Archives of Internal Medicine, November 15, 1915, Samuel W. Lambert, M.D., and Henry S. Patterson, M.D., of New York, present some interesting notes concerning the prevalence of suicide by different agents. In their opinion suicide by arsenic and by carbolic acid are decreasing in number, suicide by narcotics is at a standstill, while suicide by illuminating gas and by corrosive sublimate is on the increase. During the last twenty-five years there have been recorded 155 suicides by corrosive sublimate. Of these 73, or nearly one-half, occurred in the last two years. They ascribe this startling increase in bichloride suicide to two causes; first, the newspaper notoriety that has devoted so much publicity to it, causing an entirely erroneous impression of the condition of such patients, asserting that they suffer no pain and are conscious and cheerful to the last; second, to the facility with which the poison can be obtained. In a great many households a box or bottle of "antiseptic tablets" is part of the furnishing, sometimes for purposes of cleanliness, sometimes for preventing conception. Their red label, blue color and fancy shape is not enough to warn a child against mistaking them for candy, or even to prevent the swallowing of one in a hasty search for a "headache tablet," but they are distinctive enough to guide the suicide in securing what he thinks is an agent that will secure for him a painless exit from a hostile world. The truth is that the first effects of corrosive sublimate poisoning are very distressing and painful, the pain being distributed over the abdomen and accompanied by violent, painful and obstinate vomiting. If the poison be swallowed in solution these symptoms come on in a few minutes, but the vomiting is not sufficient to remove the poison and avert a fatal result. If an unbroken tablet be swallowed it will be ten or fifteen minutes before these symptoms are fully developed and if the fact of their ingestion is learned immediately the prompt swallowing of the whites of a dozen eggs and the injection of apomorphine, followed by gastric lavage, will give the patient a chance for his life. The indications of a fatal result appear in from 48 to 72 hours. Before that time there may be a lull in all the symptoms that may deceive the inexperienced as to the true hopelessness of the case. But at the expiration of those hours the urine begins to diminish and the diminution may continue until it almost amounts to anuria. Meanwhile the patient may remain rational for a week, but a low delirium sets in, the heart fails and the end comes. Our authors say that "even if colonic irrigation and other means restore urination" the patient still is apt to die, as the liver is hopelessly disorganized. Such, approximately, is their account of their experience. The treatment they recommend is extremely energetic. Every two hours they give 8 ounces of the following:

Bitartrate of potash and sugar, each 1 dram
Lemon juice, 1 ounce.
Water, 16 ounces.

In each of the alternate hours they give eight ounces of milk. The rectum is constantly irrigated, drop by drop, with a solution of acetate of potash, a dram to the pint of water. The stomach is washed out daily and the colon twice daily. Five hot packs are given every twenty-four hours. Cases that have taken but one dose of the poison are classed as "moderate cases," and for such seven days of the above treatment is considered sufficient, the poison still remaining in the tissues being within the limits of safety. Those who have taken repeated doses of the bichloride require longer treatment. Diuresis, to wash the poison out of the system, is the supreme object. The damage is at its height on the tenth day, and the danger also.

A MEMORIAL OF ANGELO CELLI, LEADER OF THE GREAT ITALIAN CAMPAIGN AGAINST MALARIA.

The following notice, which has been issued by the Italian Society for the Study of Malaria, has recently been sent to me by Sir William Osler:

> "The Society for the Study of Malaria, of which Professor Angelo Celli was the founder and the animating and guiding spirit, has decided to start a subscription for the purpose of erecting in his memory a monument which will perpetuate the record of his accomplishments for all time.
>
> "It is believed that such a monument should stand on the Roman Campagna, the field of the studies and the object of the most loving care of Angelo Celli; on the spot where he has redeemed man and earth from the scourge of malaria."

It has seemed to Sir William Osler and to me that we in America, who owe so much to the life-long and persistent studies of the great physician who was the leader of the Italian campaign of prophylaxis against malarial fever, should play our part in contributing to this well-deserved memorial. May we not appeal to the physicians of America to join in honoring this great benefactor of the race?

Any contributions which are sent to the undersigned will be forwarded to the Italian committee. It is hoped that there may be a generous response and any sum, no matter how small, will be gratefully accepted.

WILLIAM S. THAYER,
406 Cathedral Street,
Baltimore, Md.

THE PINEAL GLAND INERT.

That minute particle of tissue, no larger than a pea, known as the epiphysis cerebri, or pineal gland, has long been an object of curiosity to students of anatomy and physiology. Its central situation in the skull has made its exposure in the living animal without causing death a delicate and difficult operation, while the speculations concerning its functions have ranged from considering it as the source of a secretion controlling anatomical development, to an idea that it is the center of intelligence or the seat of the soul.

Recent investigations at Johns Hopkins University by Dr. W. E. Dandy seem to clear up one point concerning its functions. Dr. Dandy has succeeded in removing the pineal glands from a number of puppies without apparently influencing their growth or development in any respect. They are neither larger nor smaller, fatter nor leaner, brighter nor more stupid than their controls, and their sexual development was neither precocious nor retarded.

The pineal gland would seem to be a structure residual and degenerate from a long-vanished form of existence, a sort of appendix coniform, so to speak. Of course, further investigation is required before such a disposition of it can be considered unquestionable and permanent, but meanwhile to use it or extracts made from it as a therapeutic agent is absurd.

BOOK REVIEWS

The Practitioner's Visiting List for 1916.

Four styles: weekly, monthly, perpetual, sixty-patient. Pocket size; substantially bound in leather with flap, pocket, etc.; $1.25 net. Lea & Febiger, publishers, Philadelphia and New York.

The Practitioner's Visiting List embodies the results of long and studious effort devoted to its development and perfection, and is the final result of over thirty years' experience in meeting and anticipating the needs of the practicing physician. It is a practical convenience which, once possessed, becomes indispensable to the busy practitioner.

Case Histories in Diseases of Women, Including Abnormalities of Pregnancy, Labor, and Puerperium.

By Charles M. Green, A.B., M.D., Professor of Obstetrics and Gynecology in Harvard University; Senior Surgeon for Diseases of Women Boston City Hospital; Visiting Physician Boston Lying-in Hospital. With 11 full-page plates, one cut and 25 charts in the text. 480 pages. Cloth, $4.00. Boston: W. M. Leonard, 1915.

Professor Green has divided woman's life into five periods, namely, Infancy and Childhood, Puberty and Adolescence, Maturity, The Climacteric, and Anility. Each of these he prefaces with a general discussion of the diseases common to that particular stage, and follows with a number of well selected cases. It is full of helpful suggestions at every turn.

To us the one deplorable omission is his failure to speak of the exceedingly great, and often curative, value of radium in inoperable and recurrent carcinoma of the uterus as well as in those cases of fibroids in which for various reasons operation is undesirable.

However, we read the book from cover to cover with the keenest enjoyment, and consider it one of the most fascinating works we have seen in years. It deserves a place upon the shelf of every man who does gynecology or obstetrics, or whose work requires the recognition of such conditions.

Diseases of the Nervous System; a Text-Book of Neurology and Psychiatry.

By Smith Ely Jeliffe, M.D., Ph.D., Adjunct Professor of the Mind and Nervous System New York Post-Graduate Medical School and Hospital, and William A. White, M.D., Superintendent of the Government Hospital for the Insane. Washington, D.C.; Professor of Nervous and Mental Diseases Georgetown University; Professor of Mental Diseases George Washington University, and Lecturer on Psychiatry U. S. Army and U. S. Navy Medical Schools. Octavo. 796 pages, with 331 engravings and 11 plates. Cloth, $6.00 net. Philadelphia and New York: Lea & Febiger, 1915.

The great majority of medical books appearing today would seem to have no other justification for their existence than that the publisher needs a new seller in that particular line to offset a similar new work of a rival house. This naturally leads to a hasty rehash of the literature with borrowed cuts instead of a substantial contribution to the subject.

The work under discussion is unique in that it attacks the problem of nervous diseases from a new angle, i. e., from a phylogenetic standpoint, dividing the work into the vegetative, the sensori-motor, and the psychic. No arbitrary distinction is made between neurology and psychiatry, and, since they are both diseases of the nervous system, they are treated together in one volume. The book so carefully planned along these lines and so ably written is sure to meet with a success which it so rightly deserves.

A Text-Book of Pathology.

By Alfred Stengel, M.D., Professor of Medicine University of Pennsylvania, and Herbert Fox, M.D., Director of the Pepper Laboratory of Clinical Medicine University of Pennsylvania. Sixth Edition. Reset. Octavo of 1045 pages, with 468 text illustrations, many in colors, and 15 colored plates. Philadelphia and London: W. B. Saunders Co., 1915. Cloth, $6.00 net, and half morocco, $7.50 net.

The new edition of this book places it well in the front ranks of single-volume pathologies in English. The authors have produced a most useful work, clearly written and well illustrated. Without possessing any distinctive features it is a well-rounded and creditable book.

Practical Materia Medica and Prescription Writing With Illustrations.

By Oscar W. Bethea, M.D., Ph.G., F.C.S., Assistant Professor of Materia Medica and Instructor in Prescription Writing Tulane University of Louisiana; formerly Professor of Chemistry and Professor of Pharmacology Mississippi Medical College, etc. Philadelphia: F. A.Davis Co. Cloth, $4.00 net.

As a materia medica it varies from fair to indifferent, but is exceptionally good in containing a large variety of good prescriptions. Furthermore, its thorough treatise upon prescription writing is the best we have seen. In the latter respect it fills a distinct place in the armamentarium of the neophyte and the busy physician.

A Text-Book of Surgery for Students and Practitioners.

By George Emerson Brewer, A.M., M.D., Professor of Surgery College of Physicians and Surgeons New York; Surgical Director Presbyterian Hospital; Consulting Surgeon Roosevelt Hospital, assisted by Adrian V. Lambert, M.D., Associate Professor of Surgery Columbia University; Attending Surgeon Presbyterian Hospital; and by members of the surgical teaching staff of Columbia University. Third Edition. Thoroughly revised and re-written. Octavo, 1027 pages, with 500 engravings and 23 plates in colors and monochrome. Philadelphia and New York: Lea & Febiger, 1915. Cloth, $5.50 net.

Any industrious person can collect a mass of work which has been done upon a subject. But

to discard the chaff and to use only that which is essential is a very different proposition. The latter is the task which Dr. Brewer has had to perform, and he has done it well. This little volume has been brought fully up to the minute. The plates are good and it is quite readable. A better work of its size on surgery we have not seen.

The Clinics of John B. Murphy, M.D., at Mercy Hospital, Chicago.

Philadelphia and London: W. B. Saunders Co., August and October, 1915.

Among a great variety of interesting topics, they contain many bone cases, in which line Dr. Murphy appears at his best. However, like all the great doctors' writings, they abound in dogmatic statements which are matters of his own personal opinion. For instance, take the almost amusing statement that a keloid in a white woman was due to the fact that she had been nursed at the breast of a negro "mammy". The natural inference is that had she received cow's milk instead she might have grown horns. Yet such faults fade into insignificance when compared with the vast wealth of their information which is narrated in an entertaining conversational style. No surgeon can afford to miss Murphy's "Clinics." The reviewer regards their perusal as among the most pleasant of his duties.

Principles and Practice of Obstetrics.

By Joseph B. DeLee, A.M., M.D., Professor of Obstetrics at Northwestern University Medical School. Second Edition. Thoroughly revised. Large octavo of 1087 pages, with 938 illustrations, 175 of them in colors. Philadelphia and London: W. B. Saunders Co., 1915. Cloth, $8.00 net; half morocco, $9.50.

Always a very creditable book, the new edition shows still more painstaking work. Important additions have been made to the chapters on the Abderhalden pregnancy reaction, "dry labor," "twilight sleep," extra-peritoneal cesarian section, blood pressure, and labor in mature primiparae. One is impressed throughout by the very practical nature of the work.

SOUTHERN MEDICAL NEWS

ALABAMA.

At the January meeting of the State Board of Medical Examiners 29 persons took the examinations. Four of them were negroes. Of the entire number only nine were successful.

Governor Henderson appointed nine physicians to represent the state at the meeting of Alienists and Neurologists at Chicago, June 19, 1916.

The State Department of Education has specified February 25th to be observed as "health day" in the public schools of Alabama. The State Superintendent has urged the people in the country to study and plan for the prevention of disease, as it has been shown that people in cities suffer less from disease of any kind than those in the country.

In Mobile during the month of December the only deaths from infectious diseases were twelve, all due to tuberculosis, eleven colored and one white. Several cases of typhoid fever, scarlet fever and diphtheria were reported; none fatal.

The Birmingham city commission has passed a sanitation law with most excellent provisions. Dr. Charles Whelan, who has served Birmingham as City Physician for seventeen years, has resigned his position and will give all his time to active practice. Rev. George Eaves, secretary of the Jefferson County Anti-Tuberculosis Association, reports that fifty persons, twenty-six of whom were white, were examined in January and thirty-six were cases of positive tuberculosis. The nurses made 320 visits during the month.

Dr. Leon A. Fox has been appointed first lieutenant in the Medical Reserve corps.

Dr. V. J. Gragg, county physician for Chilton county, has resigned his position and will locate in Birmingham.

Dr. C. K. Maxwell, of Kellyton, has been elected county health officer of Coosa county for 1916.

At Tuscaloosa, Drs. J. H. Ward, D. W. Ward and J. H. Somerville have formed a partnership for the practice of medicine, with offices in the Masonic Temple.

The City Commission of Tuscaloosa has passed an ordinance to regulate the issuing of licenses to persons who treat diseases of human beings. The license was fixed at $18.00 per year, with a penalty not to exceed $100.00 for violation.

G. J. Hubbard, adjutant-general of the Alabama National Guard, reports that great improvements have been shown in the medical corps of the guards during the year 1915, and it is now one of the most important branches of the military service in the state.

ARKANSAS.

The Mississippi County Medical Society has elected the following officers: Dr. C. M. Harwell, President; Dr. M. O. Usery, Vice-President; Dr. Earl E. Craig was re-elected Secretary-Treasurer.

Helena reports five cases of smallpox, all under control.

Dr. C. W. Garrison, State Health Officer, reports that malaria was the most prevalent disease in the state, there having been in 1915 6,071 cases among white persons and 2,154 among negroes. Pellagra was second with 725 whites and 647 negroes. The throats of 7,162 school children were examined and 457 were found to be diphtheria carriers.

At Little Rock the City Physician, Dr. M. J. Barlow, reported 214 deaths in 1915, 106 white and 108 colored. Malaria caused 31 deaths, tuberculosis 27, and pneumonia 20.

At Conway, Dr. J. S. Westerfield has been

(Continued on page 24)

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(Continued from page 282)

named County Health Officer to succeed Dr. George S. Brown, resigned.

At Little Rock, Dr. E. P. Bledsoe, superintendent of the State Hospital for Nervous Diseases, has appointed Dr. Pat Murphy, of Little Rock, and Dr. Robert Roland, of El Dorado, to fill vacancies created by resignations.

Dr. C. W. Garrison, State Health Officer, received January 20th a report of an outbreak of smallpox at Mena, Polk county.

At Biscoe, Prairie county, it is reported that cerebro-spinal meningitis prevailed January 25th; that there had been three deaths and that six other persons had the disease. Funds were appropriated from the county treasury to provide serum for those unable to buy it, and isolation was enforced. The worst epidemic of grippe in the history of the state prevailed in the county.

At Lake Village, Dermott, Eudora and Empire, Dr. W. L. Treadway, U. S. P. H. Service, has cooperated with the Chicot county Board of Health in inspecting the public schools.

At Spiro, Dr. W. G. Hartshorn continues to suffer severely from the injuries he received in a runaway of his team January 5th. About six weeks before that he was injured in a similar accident.

At Russellville, January 8th, it was reported grippe was very prevalent in a severe form and that there was also considerable pneumonia.

The Polk County Medical Society has elected the following officers: Dr. John R. Davis, President; Dr. J. G. Hilton, Vice-President, and Dr. G. P. Dunman, Secretary-Treasurer.

Deaths.

At Texarkana, January 11th, Dr. Charles A Smith, aged 60, chief surgeon of the Cotton Belt railway's general hospital, died at the hospital. He had been the chief surgeon since 1887.

DISTRICT OF COLUMBIA.

In the week ending January 8th there were 25 deaths from pneumonia in the city of Washington. The total deaths were 141. Grippe caused 11 deaths. No person between the ages of 6 and 25 years died of pneumonia. Eight deaths occurred in persons under six years and six were over seventy. Grippe-pneumonia is not included in the above figures. In the week ending January 22d there were 12 deaths from grippe, making 34 since January 1st.

On February 1st the regulations against the use of common towels and drinking cups in schools and public places became effective and seem to have been generally accepted. A new source of infection has been suggested in the indiscriminate distribution of lead pencils in the public schools. They are collected at the close of each day for sharpening and distributed the following day. Most children unconsciously insert the pencil in the mouth upon using it. However, the school authorities in Washington deny that the sharpened pencils are "indiscriminately" distributed.

The city health authorities have stopped the country dealers from selling pork exposed to the dust on their stands, excepting sausage meat wrapped in pound packages.

Col. Jefferson Randolph Kean, of the medical corps, was temporarily detailed by the War Department to co-operate with the American Red Cross in organizing field hospital and supply resources for quick mobilization in case of emergency.

Deaths.

On February 7th Dr. George Hamilton Schwinn, first assistant physician at the Government Hospital for the Insane, died in his apartment in the hospital, after an illness of long duration. His age was 42 years.

On January 15th Dr. Benjamin F. Gibbs, of Columbia Heights, died at his residence, aged 57 years.

On January 16th Dr. E. J. Collins, for many years connected with the Postoffice Department, died suddenly at his residence, aged 67 years.

On January 21st Dr. Joseph A. Mudd, a confederate veteran, died at his home in Hyattsville, aged 76 years.

FLORIDA.

Dr. Sheldon Stringer, City Health Officer of Tampa, says that city has escaped, to a great extent, the epidemic of grippe elsewhere prevalent.

At Tarpon Springs, the physicians have announced an increase in their schedule of fees, rendered necessary by the increased cost of living and the enormous advance in the prices of medicines they are obliged to supply.

At Sanford, medical inspection has begun of all school children in Seminole county. It will be conducted by Dr. Oliver J. Miller, county physician. Particularly close scrutiny will be made of the eye, ear, nose and throat, but no abnormalities will be neglected.

In Jacksonville, January 31st, the sanitary inspector reported but six restaurants rated at 100 per cent, or as near perfect as possible. None were rated at less than 85 per cent. The epidemic of grippe has not shown much malignancy there, but preventive measures are advised.

Pensacola reports health conditions ideal—no contagious diseases, absolutely pure water and a death rate among the white population of only 11.85%.

The Florida State Board of Health is issuing a weekly letter to the public. That of January 1st was a booklet entitled: "Health is Wealth—A Manual of Health Work Prepared for the Schools of Florida." It has been made official for instruction in the schools of the state by the State Superintendent of Public Instruction, Professor W. N. Sheats.

Deaths.

At Macclenny, January 15th, Dr. John W. Strickland died after an illness of but two days.

GEORGIA.

At Waycross, January 20th, Dr. F. C. Nesbit has been elected City Physician. The office imposes the duties of Assistant Health Officer and Pure Food Inspector.

At the annual meeting of the State Board of Health, held Tuesday, January 11th, at Atlanta, Dr. H. F. Harris resigned his position of Secretary. Dr. A. G. Fort was expected to be his successor.

(Continued on page 26)

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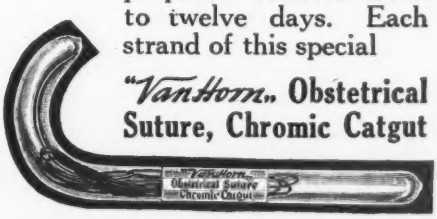

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(Continued from page 24)

It is reported that the State Sanatorium at Milledgeville has cared, during the past year, for over 4,000 patients. In a campaign against rats 5,002 of the rodents were destroyed, and the place was also almost cleared of flies. The deaths of the inmates averaged about two daily. The per capita cost of feeding and clothing the inmates has been reduced to 41 cents per day.

Miss Chloe Jackson, executive nurse of the W. G. Raoul foundation, began a definite survey and relief work on the 1st of August last in the cities of Brunswick and Albany. In Brunswick 30 cases of tuberculosis were found, 7 of pellagra and 45 others suffering from various chronic diseases.

The Spaulding County Medical Society on January 7th elected the following officers: Dr. J. M. Thomas, President; Dr. C. L. Tucker, Vice-President; Dr. E. R. Anthony, Secretary-Treasurer.

At Atlanta, January 28th, Dr. Mell C. Martin was unanimously re-elected Prison Physician by the Council Prisons Committee.

Savannah reports practically free from contagious and infectious diseases February 1st. There was no typhoid fever, malaria or measles.

On February 1st Dr. T. F. Abercrombie, County Health Officer for Glynn county, inaugurated a week's campaign for better health conditions. Lectures and addresses were made to both white and colored people at their schools and roused intense interest.

Emory University in Atlanta is conducting a campaign to raise half a million dollars to endow its medical department, which resulted from a consolidation of the Atlanta Medical College and the Emory University.

At Savannah the Council has passed an ordinance forbidding the sale from push carts of candies, ice cream and cakes.

The seventh annual meeting and election of officers of the Anti-Tuberculosis Association was held at the headquarters, 23 East Cain street, January 27th. The following officers were elected: H. M. Willet, President; Kendall Weisiger, First Vice-President; Mrs. H. W. Salmon, Second Vice-President; Dr. H. W. Davis, Treasurer.

Dr. J. P. Kennedy, City Health Officer of Atlanta, is highly gratified over the "tremendous" reduction in the past two years in the number of dairy cows in and near the city infected with tuberculosis. Out of the first 500 cows now undergoing annual examination only five of them were infected. As a partial result of the improvement of milk the death rate from tuberculosis in 1915 was the lowest in the history of the city.

Deaths.

At Athens, February 3d, Dr. James M. Lumpkin died at his home, aged 81 years.

KENTUCKY.

At Lexington, Health Officer Simmons stated in January that a number of cases of mouth disease had been reported to the department and warns citizens not to use a common drinking cup in public places.

At Carlisle, January 26th, the Health League of Nicholas County was conducting an inspection of pupils of the public schools. Of the 797 children examined 50 were reported as having symptoms indicating tuberculosis.

At Louisville, in the December number of the Health Department's publication, "Health and Hygiene," it was stated that since the first of September not a case of smallpox had been found in the city and that during the preceding fiscal year there were 500 fewer cases than in the year before. Rigid vaccination in every branch of employment had wrought the change.

At Waddy, January 10th, Dr. John F. Jessee was seriously injured in an automobile accident. He was taken to the Norton Memorial Infirmary, Louisville.

At Louisville, Dr. Henry Enos Tuley was elected President of the Iroquois Life Insurance Company January 20th.

At Versailles, January 17th, all smallpox quarantines against houses in the city were lifted, as there were no new cases reported in the city or county.

At Christiana, January 18th, Dr. T. M. Righter was seriously injured by a collision of his automobile with an L. & N. freight train.

At Owensboro, in January, investigations in the city public schools revealed that a number of students were suffering from trachoma. Treatment was administered free of charge.

The Louisville County Board of Health has instructed the 17 county patrolmen to kill all stray dogs, as a precaution against rabies.

At Elizabethtown, January 28th, Dr. C. Z. Aud, of Cecilia, was reappointed a member of the State Board of Health.

At Glasgow, February 5th, the County Board of Health declared the town spring branch a nuisance and dangerous to the public health and ordered the City Council to remedy it within 180 days.

At Louisville, there is some opposition to the vaccination of school children, and Prof. C. W. Campbell, principal, estimates that 300 pupils had been excluded because of non-compliance.

Deaths.

At Horse Cave, January 8th, Dr. T. H. Garvin died at his home of abscess of the liver.

At Hardin, January 5th, Dr. J. B. Wilson died at his home, aged 78 years, of pneumonia.

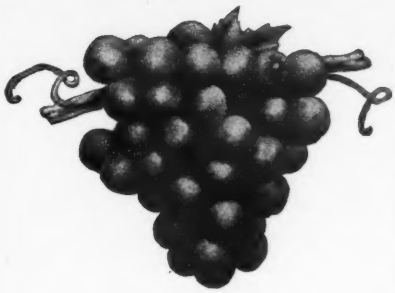
LOUISIANA.

Dr. Oscar Dowling was informed January 22d that Dr. J. L. Burke, who practices osteopathy, had filed a libel suit against him and Sheriff Perkins, of Grant parish, for $25,000, charging false imprisonment and damage to his character and practice. Burke was arrested for falsely representing himself as an employee or agent of the State Board of Health.

At Lake Charles, the epidemic of typhoid fever has been stamped out. The inspectors during the work visited over 2,000 houses.

Dr. C. C. Bass, of Tulane College of Medicine, has been appointed head of a group of scientific workers to study malaria in Mississippi, under the direction of the International Health Commission. Dr. W. S. Leathers, head of the Health Department of Mississippi, will be associated with him.

(Continued on page 28)



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(Continued from page 26)

At Westlake, January 8th, a severe epidemic of typhoid fever was prevailing and several deaths had occurred. The drinking water used comes from cisterns and not from wells or springs.

Car No. 4, of the State Board of Health exhibit train, comprising a garage, laboratory and all necessary apparatus, arrived in New Orleans January 15th. The car is the first of its kind and will be used for analyzing water while it is touring the state, and will be available for use whenever an epidemic of any kind may start.

On January 10th the New Orleans City Board of Health reported that the recent epidemic of diphtheria had been overcome and conditions were once again nearly normal.

The Rapides Parish Medical Society has elected the following officers: Dr. Marvin Cappel, President; Drs. F. V. Gremillion and Ralph Kilpatrick, Vice-Presidents; Dr. E. R. Gandy, Secretary-Treasurer.

Dr. Oscar Dowling, President of the State Board of Health, has addressed a letter to all the district judges in the state asking them to charge their grand juries on sanitary matters and urge stricter enforcement of sanitary laws.

Deaths.

At Baton Rouge, January 23d, Dr. T. P. Singletary, died at his home after an illness of one year's duration.

MARYLAND.

At Baltimore, January 26th, Mrs. H. K. Knorr was appointed superintendent of the tuberculosis division of the City Health Department. The tuberculosis nurses, the school nurses and the infectious disease nurses have been consolidated under her command.

The Baltimore Health Department has ordered undertakers not to furnish their own rugs, draperies, canopies and like materials in connection with public or private funerals. It is supposed that they spread infections.

The Baltimore County Medical Society has elected the following officers: President, Dr. J. Carroll Monmonier, of Catonsville; Vice-President, Dr. Frank C. Eldred, of Sparrows Point; Secretary-Treasurer, Dr. Martin F. Sloan, of Towson.

The Baltimore death record for the week ending January 22d numbered 241, which is 38 more than that of the corresponding week in 1915. Grippe proved fatal in 18 cases and pneumonia in 51. There were 209 cases of measles.

At Baltimore the Harrisonville public school has once more been closed on account of diphtheria.

In January scarlet fever appeared among the children in the Maryland Deaf and Dumb Asylum at Frederick. Fifty of the children came to Baltimore for their Christmas vacation, but they were immediately returned and the cases segregated.

Out of the number of applicants for license to practice medicine in Maryland examined by the Board of Medical Examiners of Maryland 30 were successful.

The State-wide Tuberculosis Committee appointed in May, 1915, by former Governor Goldsborough, reports declaring in favor of establishing county hospitals for negro tuberculosis patients as the most effective and economical means of fighting the disease, such hospitals to be established in connection with the present county institutions; also for the equipment of wards for tuberculosis negroes in the hospitals in Baltimore, and in eight other cities of the state receiving government aid.

Dr. John D. Blake, the Baltimore Commissioner of Health, proposes to supply the city officials and employees with small "stickers" calling attention to the necessity for the use of handkerchiefs. They are to be used as seals on envelopes and bear illustrated mottoes.

The Gillman Country School for Boys, at Roland Park, has an outbreak of chickenpox, and all social functions of the school have been canceled.

At Annapolis, a case of scarlet fever developed at St. John's College and the authorities suspended school work for ten days or more.

The Anne Arundel County Branch of the Maryland Society for the Prevention and Relief of Tuberculosis elected the following officers: President, Dr. Thomas Fell; Honorary Vice-Presidents, Governor Harrington, Superintendent Eberle of the Naval Academy, and Mayor Strange; First Vice-President, Major John DeP. Douw; Second Vice-President, Prof. D. M. Garrison; Secretary, Dr. J. Oliver Purvis.

Deaths.

On January 10th Dr. Daniel Parke Custis died at Johns Hopkins Hospital, aged 63 years. He was a resident of Annapolis.

On January 29th, at Snow Hill, Dr. E. E. Wisehart died at his residence, aged 29 years, from acute Bright's disease.

At Laurel, February 3d, Dr. William A. Marbury died at his home, aged 75 years.

At Rockville, February 5th, Dr. Elisha C. Etchison died in a hospital, aged 68 years.

MISSISSIPPI.

At Jackson, January 26th, the State Board of Health appointed Dr. Robert Donald County Health Officer. Dr. Willis Walley was reinstated State Sanitary Inspector. The board elected Dr. C. D. Mitchell, of Pontotoc, President; Secretary, Dr. J. D. Gilleyran, of Jackson.

Governor Bilbo, on January 21st, appointed eight members of the State Board of Health, as follows: Dr. R. L. McDougal, Booneville; Dr. J. H. McNeill, Olive Branch; Dr. W. W. Hall, Ruleville; Dr. C. D. Mitchell, Pontotoc; Dr. Tom W. Reagin, Union; Dr. H. F. Garrison, Seminary; Dr. B. L. Crawford, Tylertown; Dr. J. D. Gilleylen, Jackson.

The Winona District Medical Society elected the following officers: Dr. Smith, of Kilmichael, President; Dr. T. W. Holmes, of Winona, Secretary-Treasurer.

On January 15th Dr. L. L. Bowman, of Lincoln county, had six ribs broken in an automobile accident.

The medical societies of Scott, Tippah and Union counties have endorsed the act pending in

(Continued on page 30)

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(Continued from page 28)

the Legislature for the establishment of a state sanitarium for the care of persons suffering with tuberculosis.

The Yazoo County Medical Society elected the following officers: Dr. J. I. McCormick, President; Dr. C. S. Coker, Vice-President, and Dr. S. W. Purifoy, Secretary-Treasurer.

The Columbus Council has appointed the following as members of the City Board of Health: Dr. C. R. Berry, Dr. J. W. Cox, Mr. L. W. Richardson and Hon. C. L. Garnett.

Deaths.

At Hazlehurst, January 5th, Dr. J. S. Beavers, aged 76 years, died at his home from the effects of an operation.

NORTH CAROLINA.

At Wilmington, January 25th, Dr. C. F. Bolles, who for three years has been a member of the City Board of Health, resigned his position in order to devote himself to his private practice.

At Raleigh, January 23d, Dr. C. A. Shore, Director of the Laboratory of Hygiene of the State Board of Health, announced that the laboratory has succeeded in manufacturing smallpox vaccine for free distribution to the citizens of the state. It will be distributed through county and city health officers, who will supply physicians.

Orange county has voted $500 to have her school children inspected, as is the case in the adjoining county of Allamance.

Dr. Edwin Gladmon, superintendent of the Southern Pines Sanatorium for the treatment of tuberculosis, considers the average lodge room a source of infection of tuberculosis and other foul air diseases. He considers the cuspidors the chief offenders.

Dr. J. C. Braswell, whole-time Health Officer for Nash county, is having the colored schools inspected the same as are the white schools. He reports that 80% of all the schools have sanitary, fly-proof closets and expects to supply the missing 20% during the present term.

Mecklenburg and Cabarras counties were the first to make application and be accepted by the State Board of Health for the unit of anti-typhoid work which the board proposes to do for a number of counties this summer. The work involves immunization of the citizens.

Deaths.

At Salisbury, February 1st, Dr. J. W. Blackmer, a prominent young physician, died at his home from acute Bright's disease.

OKLAHOMA.

Dr. R. L. Mitchell, of Vinita, was thrown from his buggy in December and fractured his left leg. Dr. W. R. Butler, of Maud, was also recently severely injured by being thrown from a buggy.

St. Anthony Hospital, Oklahoma City, has launched a campaign to raise $150,000 to build a four-story addition and establish a clinical laboratory.

Dr. J. W. Duke, of Guthrie, State Commissioner of Health, has enlisted the co-operation of over 400 daily and weekly newspapers of Oklahoma, who will publish short health articles written in popular style by Dr. Duke, at frequent intervals.

SOUTH CAROLINA.

At Greenville, January 1st, Dr. E. A. Hines, editor of the Journal of the South Carolina Medical Association, has resigned the position of superintendent of the Anderson County Hospital.

Dr. J. Mercier Green, City Health Officer of Charleston, has made a full report for 1915, in which he urges larger appropriations for those working in the health office and cites instances where the salaries would hardly pay the actual expenses of the offices and indispensable assistants. He considers the work done as very satisfactory, as shown by the decrease in the death rates and the improvement in the dairies and slaughter houses.

It is stated that Dr. John Hydrick, a young Spartanburg physician, has received an appointment with the Rockefeller Institute of New York to do special research work.

Notice has been received of the appointment of Dr. T. B. Reeves, of Greenville, as diagnostician for the Mayo Clinic in Rochester, Minn.

Deaths.

At Columbia, Feb. 1st, Dr. W. A. Byers was found dead in bed in a rooming house when he was called to breakfast. His age was about 58 years.

TENNESSEE.

At Columbia, January 18th, Dr. P. D. Biddle, the City Health Officer, stated that health conditions were rapidly improving, though the recent epidemic of grippe had been very severe.

Dr. W. E. Hibbett, City Health Officer of Nashville, has appointed Dr. H. K. Alexander as Quarantine Officer and Medical Inspector; Mrs. M. K. Pearce as nurse in the Infant Welfare Department; Miss Vera Moorehead as nurse in the Tuberculosis Department, and Rhoda Pugh as colored nurse in the same.

The Sumter County Medical Society has elected the following officers: Dr. T. Y. Carter, President; Dr. J. R. Parker, Secretary-Treasurer.

A decision of the civil court at Jackson has forced the Kingston negro doctor, James S. Anderson, to discontinue practice without license.

The Hollywood County Medical Society met at Brownsville and elected the following officers: Dr. D. Poston, President; Dr. J. C. Norvill, Vice-President; Dr. J. L. Edwards, Secretary-Treasurer.

At McMinnville, the Warren county court has re-elected Dr. Q. C. Cantrell County Health Officer for 1916.

At Johnson City, January 7th, Dr. J. E. Humphreys, physician on the County Medical Pension Examining Board, resigned.

Mr. Rudolph B. Watson, formerly of the Panama canal zone, has been appointed Chief Health Officer of North Chattanooga. The law prohibiting the keeping of pigs within the municipality has resulted in removing the trouble of which many residents formerly complained.

Williamson county is to have three sanitary stations with inspectors regularly employed to canvass the entire county, inspecting premises and urging sanitary improvements.

(Continued on page 32)

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The Quaker Oats Company
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(Continued from page 30)

Deaths.

At Covington, February 7th, Dr. J. E. Blaydes, aged 80 years, died suddenly.

At Maryville, January 24th, Dr. John W. Cates, aged 84 years, died at his home from paralysis of the heart.

At Lexington, January 11th, Dr. Robert M. Brown, aged 60 years, died at his home in Bible Hill after a brief illness.

On December 29th Dr. Thomas E. Coplin, of Midland, died in a Nashville infirmary, aged 48 years.

At Nashville, February 8th, Dr. W. H. Owen died at his home on Fatherland street.

TEXAS.

On January 13th the Dallas County Medical Society amended its by-laws so that a regular monthly day of clinical work at the various hospitals of Dallas could be added to the activities of the society.

It is reported that in January several cases of typhus fever had developed at Laredo and one at El Paso. Dr. Victor G. Heiser, of the International Health Commission, recently returned from Mexico, believes that Texas, Arkansas, Oklahoma and Louisiana are threatened with the disease from Mexico, where there are hundreds of thousands of cases.

The dead body of Dr. J. M. McDuff, of Atascosa county, was found by searchers January 10th in a dense thicket. The searchers were led to the place by a little dog which was his inseparable companion.

At a meeting of the Navarro County Medical Society at Corsicana, February 7th, it was resolved that the physicians charge a minimum fee of one dollar for examining applicants for insurance in the Home Benefit Association.

The Marion County Medical Society, at its annual meeting held at Jefferson recently, elected the following officers: Dr. J. P. Chambers, President; Dr. Clifford McCasland, Vice-President; Dr. S. A. Miller, Secretary-Treasurer and delegate to State Association; Drs. J. A. R. Mosely, R. L. Armistead and I. W. Lake, Censors.

Deaths.

At Texarkana, January 11th, Dr. Charles Abner Smith died at the age of 58 years after an extended illness.

At Houston, January 24th, Dr. J. B. Burditt was found dead in a bath tub. His age was 45 years.

At Thorndale, January 15th, Dr. L. H. Harvey, aged 35 years, died at his home from apoplexy, six hours after the attack.

VIRGINIA.

In a little hut on the city farm of Richmond, near the smallpox hospital, the Greek leper George Hodges is supported by the city, and made comfortable by many contributions from kind people. There seems to be no legal way to get rid of their unwelcome guest.

The Richmond Health Department is asking for an appropriation of $75,000 for 1916. Dr. E. C. Levy, Chief Health Officer, stated to the Council Finance Committee that it is absolutely essential to the city's health to supply the funds requested.

Dr. E. C. Levy, Chief Health Officer of Richmond, is urging Mayor Ainslie and the police board to supply houses, similar to the one used by the traffic officer at Seventh and Broad streets, for every member of the squad, to protect them from cold and snow in the winter and rain and sun in the summer.

Deaths.

At Charlottesville, February 7th, Dr. Richard H. Whitehead, dean of the medical faculty of the University of Virginia, died of pneumonia at his residence, aged 51 years.

At Clifton Forge, January 31st, Dr. J. F. Hughes died at his home, aged 82 years.

At Mt. Sidney, January 31st, Dr. William Bell died at his home four miles north of Staunton, aged 79 years.

WEST VIRGINIA.

At St. Albans, late in January, there was a sudden outbreak of typhoid fever and an examination of the drinking water and milk supplies was inaugurated by Mayo Tolman, State Sanitary Engineer.

The West Virginia Department of Health is making a campaign against all persons not complying with the license laws who practice any form of healing art, including chiropodists. Dr. S. L. Jepson, State Health Commissioner, appeared before the Roane county grand jury to testify against offenders.

An official report shows that 145,300 Red Cross seals were sold in Charleston during the holiday season for the benefit of the Anti-Tuberculosis League.

The State Department of Schools has received an official report of the first physical examination of 979 children in Paw Paw district, Marion county. Only 162 were found to have no physical defects other than defective teeth. Over 500 had something wrong with their eyes and still more had something wrong with their tonsils.

At Charleston, January 25th, there was a small epidemic of pneumonia, probably following grippe.

At Martin's Ferry, James Freeman, former state representative, has been named for the position of Health Officer at a salary of $100.00 per month.

At Hagarstown, January 22d, it was reported that there were six cases of smallpox. Some of them were so mild that the patients went about the city unaware of their condition.

On February 1st a medical survey of the 12,000 school children in McDowell county was begun by Dr. Juanita McFarland under the direction of the State Health Council and the national organization of the Anti-Tuberculosis League.

Deaths.

At Fairmont, January 19th, Dr. J. J. Durrett committed suicide by shooting. His age was 45 years. He had recently been obliged to abandon practice on account of ill health.

At Fairmont, January 4th, Dr. Hal Hall died at his home on Benoni avenue, after a brief illness.

In Farmington, January 14th, Dr. J. E. Ensminger died at his home, aged 73 years. He died of pneumonia following a severe fall.

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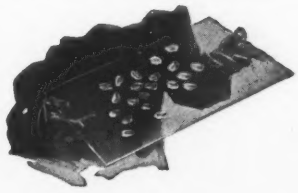

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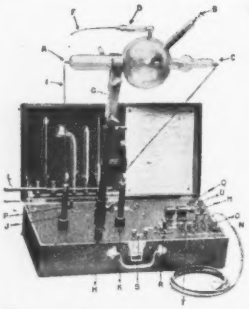

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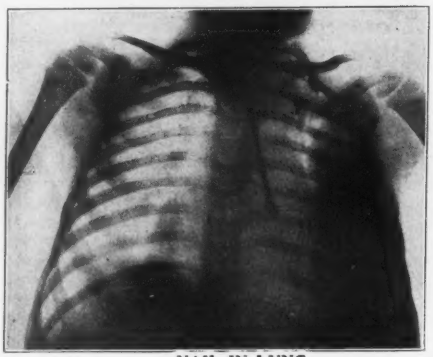

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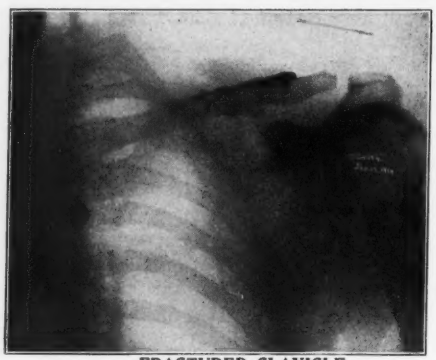

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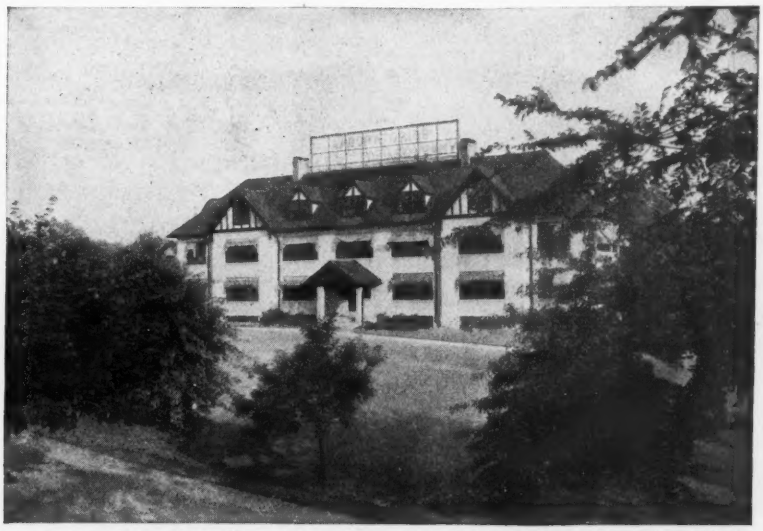

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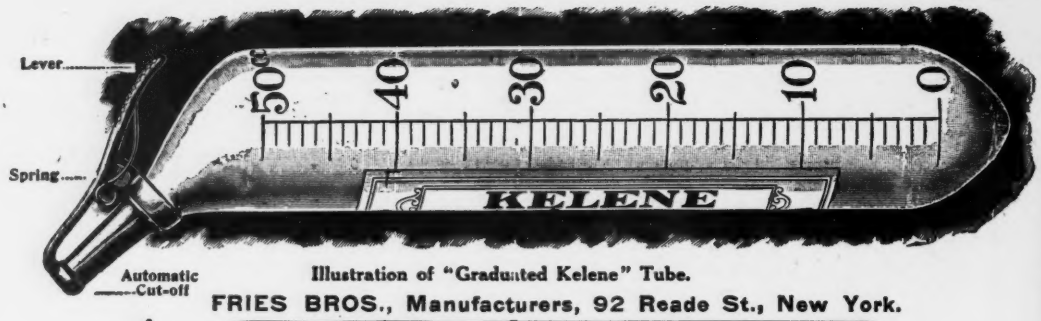

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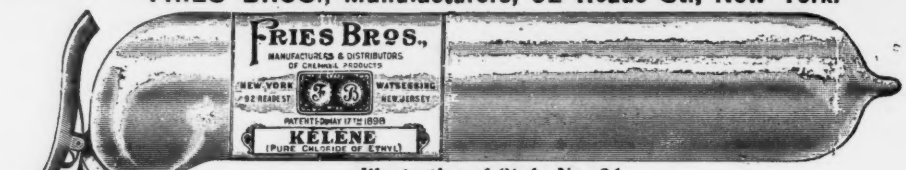

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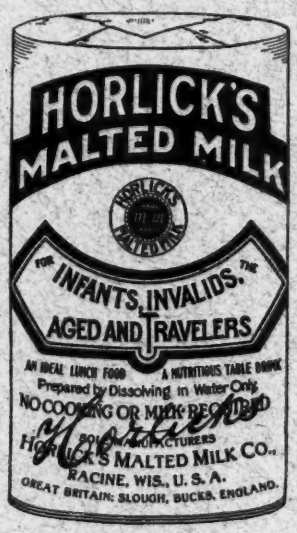
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